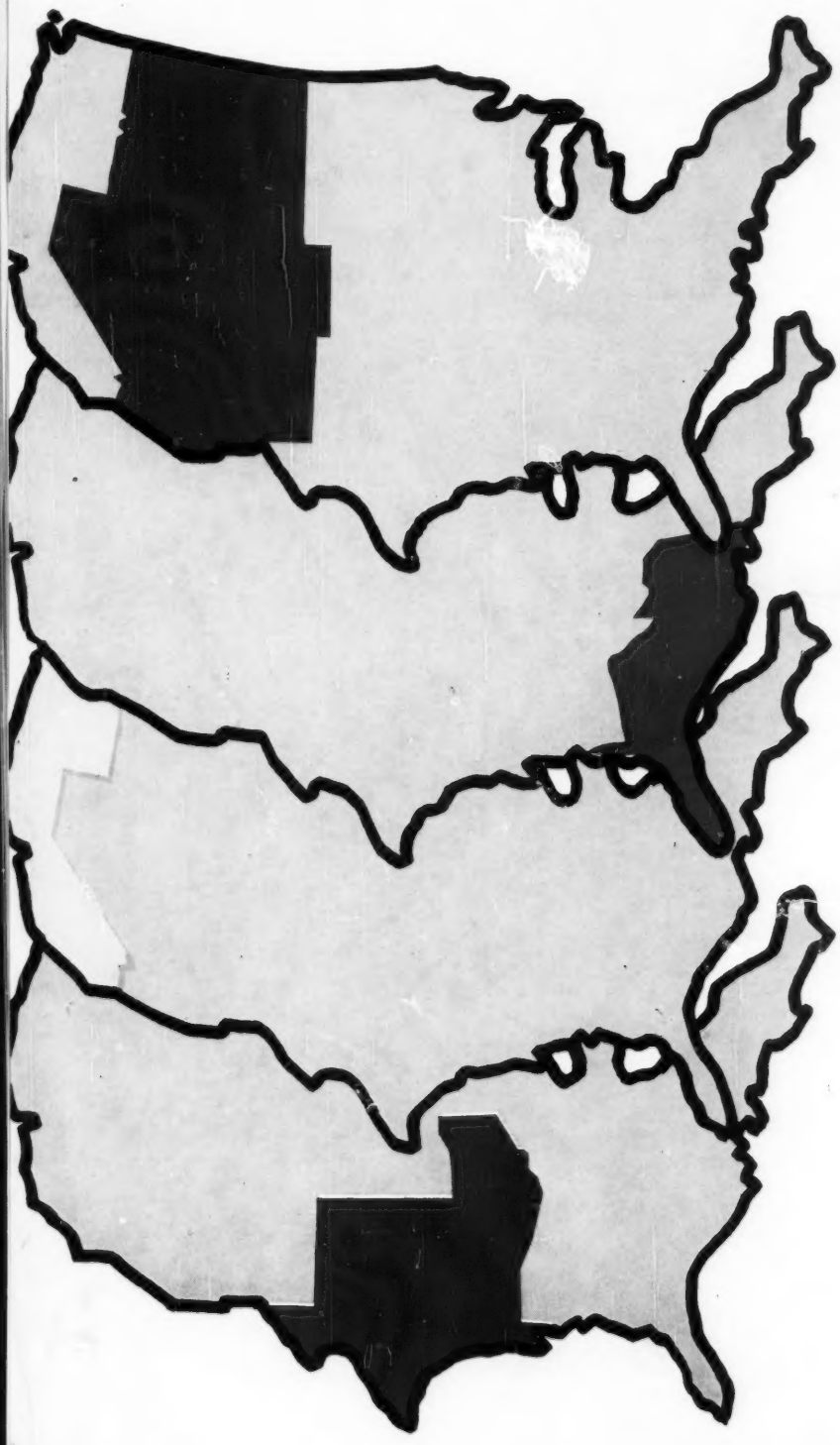
JANUARY 7, 1961

Chemical Week

A McGRAW-HILL PUBLICATION PRICE FIFTY CENTS



Monsanto plans big plant to link oil, petrochemical operations . . . . . p. 21

Sulfur in the news.

(1) Molten sulfur shipping terminals ready for doubled traffic in '61 . . . p. 54

(2) New processes spur growth of sulfur from sour gas . . p. 33

Polystyrene prices flutter. Outlook: more of the same for few weeks . . p. 31

HOW REGIONAL GROWTH PATTERNS ARE SHIFTING . p. 56

STEVENS RICE GS CH 1:
UNIVERSITY MICROFILMS INC
313 N 1ST ST
ANN ARBOR MICH

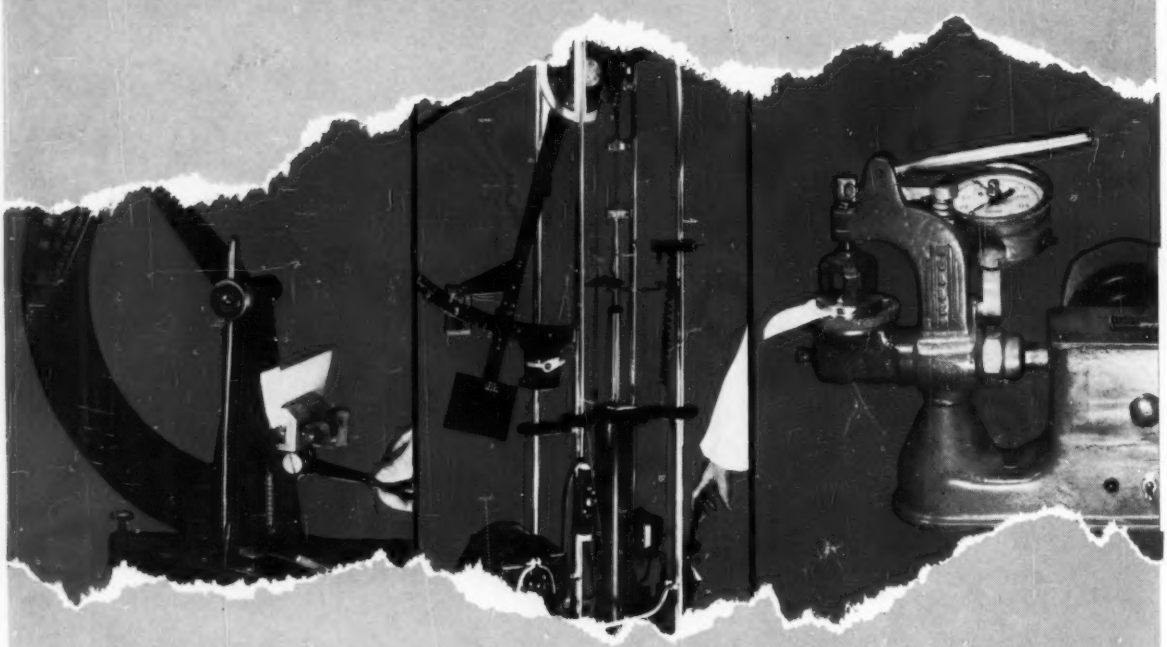
fmc®

puts paper through its paces for alkali users!

With our Princeton Research Center now in full operation, FMC is prepared to offer the paper industry better-than-ever assistance with processing problems.

Research staffs of all three divisions of FMC's Inorganic Chemicals Department now work as a team in one of the best-equipped paper laboratories outside of the paper industry. Here, these paper specialists duplicate in miniature all basic steps of paper manufacturing and evaluate results with a complete range of performance tests.

This exceptional extra service is available for the asking. Next time you have a problem call our nearest office.



CAUSTIC SODA — 50% and 73% Liquid, Regular and Rayon Grades; Flake, Solid and Ground
SODA ASH — Light, Intermediate and Dense Grades

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Chlor-Alkali Division

General Sales Offices:
161 E. 42nd STREET, NEW YORK 17

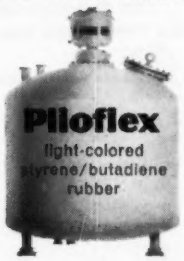
Photograph taken with the cooperation of Rubbermaid Inc., Wooster, Ohio.

They're knee-deep in selling points—thanks to PLIOFLEX

A big problem in manufacturing rubber kneeling pads is getting the right physical properties—every time.

The best answer one leading manufacturer found was to use PLIOFLEX 1510. It makes possible a more uniform open cell structure, better tear strength, and generally superior product quality—*batch after batch*. Just as important, PLIOFLEX 1510 reduces sticking and permits a lower temperature cure during molding. And uncured trim scrap can be effectively reworked, further cutting processing costs.

If you're looking for ways to improve your product—and profit-picture, look closely at PLIOFLEX 1510. For technical details on "1510," or for assistance with your specific problem, just write to Goodyear, Chemical Division, Dept. A-9417, Akron 16, Ohio.



Lots of good things come from

GOODYEAR

CHEMICAL DIVISION

Pliolex—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

AA Quality:

PHOSPHATES

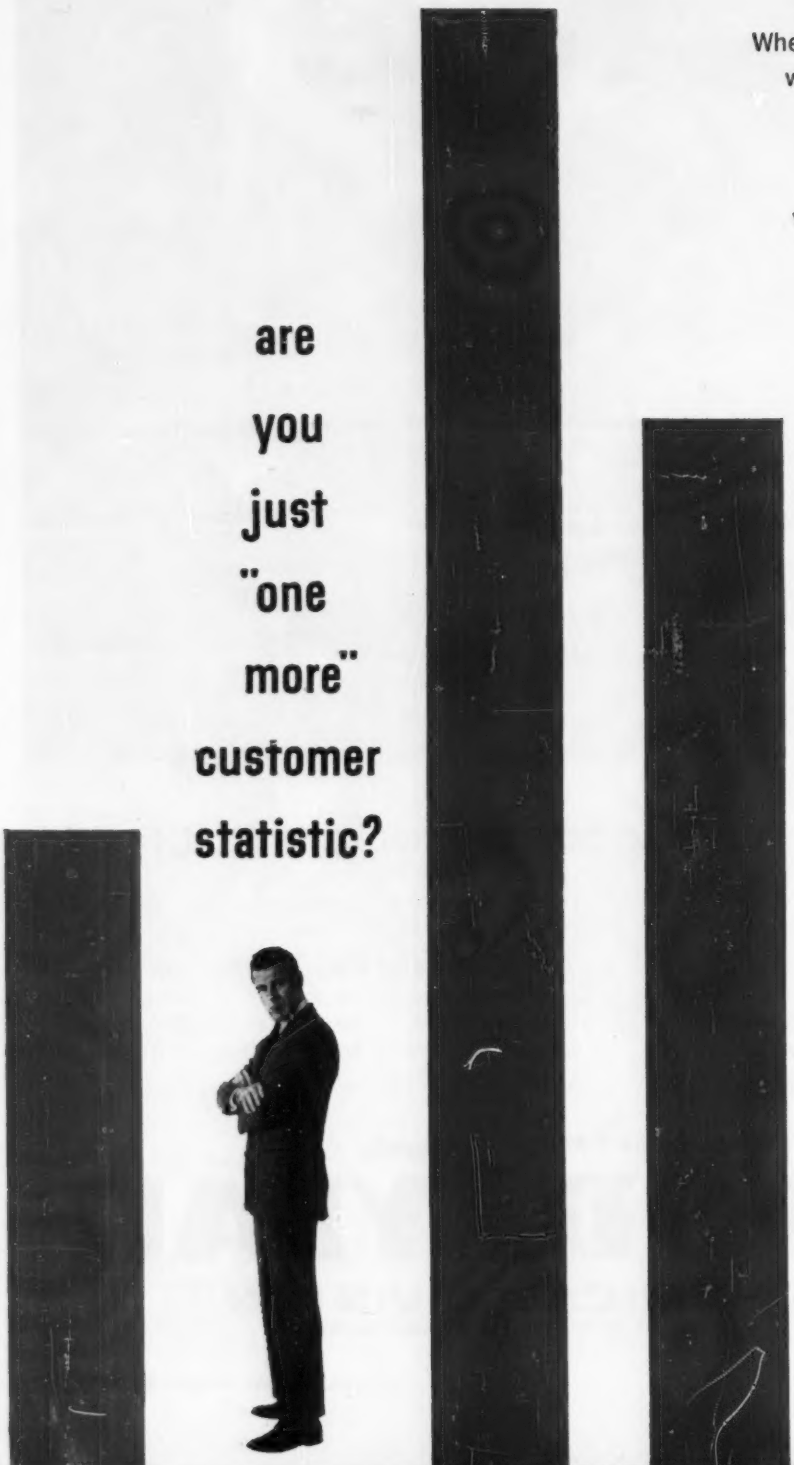
FLUORIDES

ACIDS

SILICOFLUORIDES

GELATINS

are you just "one more" customer statistic?



When your orders make an impact—
when you can count on scheduled
and emergency requirements—
when you can get management
attention to your problems
without working through layers of
sales and staff personnel—
THEN you're dealing with a
service-sized company.
It's big enough to supply you
dependably and not so big
that you're just "one more"
customer statistic.
We are "service-sized" to
our customers, and could easily
be for you in any of our
product groups.
We're easy to work with.

Chemical Division

The **American Agricultural Chemical** Company

100 Church Street
New York 7, New York

40 plants and offices

ON THE COVER: Shown on this map of the United States are the regions of greatest chemical processing growth. How will changes affect present and future markets? See p. 56.

Chemical Week

Vol. 88 No. 1 JANUARY 7, 1961

5 **VIEWPOINT**—We must face the challenge of a maturing industry.

7 **LETTERS**

7 **MEETINGS**

17 **BUSINESS NEWSLETTER**

21 Big new hydrocarbons plant will link Monsanto's oil, petrochemical lines.

22 New rules-of-the-road for CPI business are being framed in state capitols.

23 Lawsuits abound at year's start; two new actions aimed at Aries.

23 **Fish group wins out in race to build Argentine synthetic rubber plant.**

24 Euromart speedup, now in effect, means first serious trade discrimination.

27 **WASHINGTON NEWSLETTER**

31 **MARKETS—Dow's new tags bring turmoil to polystyrene prices.**

33 **ENGINEERING**— Growth in sour-gas sulfur spurs hunt for new recovery processes.

41 **TECHNOLOGY NEWSLETTER**

43 **RESEARCH**— New dyeing advances brighten polypropylene's fiber future.

47 **SPECIALTIES**— Urethane foam use in apparel may hit 2.5 million lbs. in '61.

51 **MARKET NEWSLETTER**

54 **SALES—Molten sulfur shipping terminals set for doubled traffic in '61.**

56 **ADMINISTRATION**— Plants move to markets: CPI regional growth trend.

65 **PRODUCTION**— Industry studies Army plan for country's deepest waste disposal well.

68 **BUSINESS BENCHMARKS**

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw - Hill Publishing Co., James H. McGraw (1860-1948), founder. EXECUTIVE, EDITORIAL, CIRCULATION AND ADVERTISING OFFICES: McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. Telephone, LO 4-3000; Teletype, TWX N.Y. 1-1636; Cable, McGRAWHILL, N.Y. Place of publication: Philadelphia, Pa. Second class postage paid at Philadelphia. (See below for directions regarding subscriptions or change of address.) OFFICERS OF THE PUBLICATIONS DIVISION: Nelson L. Bond, president; Shelton Fisher, Wallace F. Traendly, senior vice-presidents; John R. Callaham, vice-president and editorial director; Joseph H. Allen, vice-president and director of advertising sales; A. R. Venezian, vice-president and circulation coordinator. OFFICERS OF THE CORPORATION: Donald C. McGraw, president; Joseph A. Gerardi, Hugh J. Kelly, Harry L. Waddell, executive vice-presidents; L. Keith Goodrich, vice-president and treasurer; John J. Cooke, secretary.

United States and United States possessions subscription rate for individuals in the field of the publication, $3 per year; single copies, 50¢. Foreign subscription rates per year: Canada, $4; other Western Hemisphere countries, $15; all others, $25, payable in advance. Printed in U.S.A. Title registered in U.S. Patent Office,

Copyright 1961 by McGraw-Hill Publishing Co. Inc. All rights reserved. UNCONDITIONAL GUARANTEE: the publisher, upon direct request from any subscriber to our New York office, agrees to refund the part of the subscription price applying to copies not yet mailed.

Subscriptions to Chemical Week are solicited from management men in the Chemical Process Industries in administration, production and plant operation, design and construction, research and development, sales and purchasing. Position, company connection and nature of company's business, products and approximate number of employees must be indicated on subscription application. Send to address shown below.

SEND SUBSCRIPTION CORRESPONDENCE AND CHANGE OF ADDRESS TO FULFILLMENT MANAGER, CHEMICAL WEEK, 330 WEST 42nd ST., NEW YORK 36, N. Y. SUBSCRIBERS SHOULD NOTIFY FULFILLMENT MANAGER PROMPTLY OF ANY CHANGE OF ADDRESS, GIVING OLD AS WELL AS NEW ADDRESS, AND INCLUDING POSTAL ZONE NUMBER, IF ANY. IF POSSIBLE, ENCLOSE AN ADDRESS LABEL FROM RECENT ISSUE OF CHEMICAL WEEK. PLEASE ALLOW ONE MONTH FOR CHANGE TO BECOME EFFECTIVE.

Postmaster: Please send Form 3579 to Chemical Week, 330 West 42nd St., New York 36, N.Y.

All Shook Up by Packaging Failures?

Polyethylene Packages Chemicals Best!

SEE HOW MANY WAYS YOU CAN USE POLYETHYLENE:

- As a film for packaging fine chemicals and pharmaceuticals.
- As film liners for metal and fibre drums for both liquids and solids.
- As inner coatings on fibre drums.
- As extruded coatings and inner liners for multiwall bags.
- And, molded into light, conveniently handled containers for most strong acids and other reactive materials.
- As a combination with foil and other substrates for specialized chemical packages.

Because polyethylene builds you a tough, flexible, easy to handle package with outstanding impermeability... all at a new low cost... it's no wonder that polyethylene today stands head and shoulders above other materials for packaging a large variety of chemical products.

Chances are excellent that there is a polyethylene which you can use in your chemical packaging operations. And, UNION CARBIDE offers a complete range of BAKELITE polyethylene resins and compounds—the widest selection from any manufacturer. For more information, see your packaging supplier. He will gladly specify the correct polyethylene packages to meet your needs. Or write: Dept. **HP-27,** Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York. *In Canada:* Union Carbide Candada Limited, Toronto 12.

UNION CARBIDE

BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

Chemical Week

Robert S. Muller ..... Publisher

Howard C. E. Johnson ..... Editor-in-Chief

Ralph R. Schulz ..... Managing Editor
Emil J. Mikity ..... Assistant Managing Editor
J. Robert Warren ..... Assistant Managing Editor
Donald P. Burke ..... Associate Editor
Anthony J. Piombino ..... Associate Editor

DEPARTMENTS

Administration ..... Cooper R. McCarthy, editor; F. Bryan Williams
Business News ..... Homer Starr, editor; Charles Joslin
Engineering ..... Ryle Miller, editor; Donald M. Levin
Foreign ..... Bruce Bendow, editor
Markets ..... Philip A. Cavalier, editor; Richard T. Ozimek
Production ..... Herbert C. Short, editor
Research ..... Joseph F. Kalina, editor; Philip A. Untersee
Sales ..... Carl A. Hiester, editor; Victor H. Waldrop
Specialties ..... Richard J. Callahan, editor; Marion L. Meade
Reports ..... Jorma Hyypia, editor
Copy ..... William Mullinack, editor; Kay Sarner; Patricia Moffitt
Art ..... Robert T. Martinott, director; Richard Kluga; Forbes Linkhorn; Dolores Able
Buyers' Guide ..... Betsy L. Emery, editor; Patricia Middleton

REGIONAL EDITORS

Chicago ..... John M. Winton, editor; Nina Seawick
Houston ..... Thomas H. Arnold, editor; Wilma Cortines
San Francisco ..... Martin D. Robbins, editor; Maria Theresa Shaw

NATIONAL AND WORLD NEWS

Dexter M. Keezer ..... Economics
John Wilhelm ..... Director, News Bureaus

Domestic

Atlanta, B. F. Barnes; **Chicago**, Stewart Ramsey; **Cleveland**, Arthur Zimmerman; **Dallas**, Marvin Reid; **Detroit**, Donald MacDonald; **Los Angeles**, Kemp Anderson, Jr.; **San Francisco**, Jenness Keene; **Seattle**, Ray Bloomberg; **Washington**, George B. Bryant, Jr. Correspondents in 75 principal cities of the United States.

Foreign

Beirut, O. M. Marashian; **Bonn**, Peter Forbath; **Caracas**, John Pearson; **London**, John Shinn; **Melbourne**, Alicja Grobtuch; **Mexico City**, Peter Weaver; **Moscow**, Ernest Conine; **Paris**, Robert E. Farrell; **Rio de Janeiro**, Leslie Warren; **Tokyo**, Sol Sanders. Correspondents in 78 cities.

Knox Armstrong ..... Advertising Sales Manager
Alvin J. Babkow ..... Business Manager
Fred E. Lesner ..... Sales Promotion Manager
John M. Pierce ..... Market Service Manager
Robert L. Maier ..... Advertising Makeup
Paul W. Erb ..... Circulation Manager
Frances Regan ..... Reprints
Advertising Salesmen ..... See Adv. Index

Progress Despite Problems

THE HOLIDAYS ARE OVER. Now that we have taken down the Christmas trees and put away the noisemakers it's time once again to take up the burdens of the workaday world.

This new year is not going to be an easy one for the chemical and allied industries. Our CW Forecast (*Dec. 24, '60, p. 31*) foresees a slight rise in sales but an over-all drop in net profit—hence less money to finance the research, new-product development, and plant modernization jobs that need to be done.

The most pressing problems confronting the industries:

(1) Cost reduction in the plant through automation, modernization, process improvement and less-costly maintenance.

(2) Overcapacity for nearly all major products, often resulting in unrealistically low pricing in an effort to move goods.

(3) The squeeze on profits. In 10 years labor costs have risen 75%, equipment costs 44% but chemical prices only 29%.

(4) The higher cost of moving goods to market—viz., rail rates, truck rates.

(5) Increased competition from newcomers to the field—e.g., oil, rubber, food, paper, metal and textile firms.

(6) Industrial-relations problems posed by automation.

(7) Depreciation rules that inhibit new investment.

(8) Progressive shrinking of foreign markets as countries abroad build their own production facilities.

(9) Increased government regulation of drugs, food additives, agricultural chemicals and packaging materials.

(10) Competition of chemical products with each other rather than with natural products. For example, since synthetics already have 75% of the detergents market, new products will compete with established synthetics.

(11) An excessive proportion of employees in "middle management."

(12) Dependence on new financing—both equity and debt—to replace shrinking retained earnings.

(13) Continuing depletion of high-grade, low-cost natural resources.

(14) Rising costs of research manpower and equipment.

These problems vary in importance, of course, and many are interrelated. Many, too, we may have to learn to live with.

This suggests that our industry may be at the end of an era—an era of above-average growth, above-average innovation, above-average profitability. One is inevitably reminded of Oswald Spengler's life-cycle theory—that civilizations like organisms pass through youth, adolescence, maturity and final decay. If steel and coal and vaudeville and railroads are any test, may not the theory also apply to industries? Our industry may well be passing from adolescence into maturity, and the decade of the '50s may well have marked the turning point.

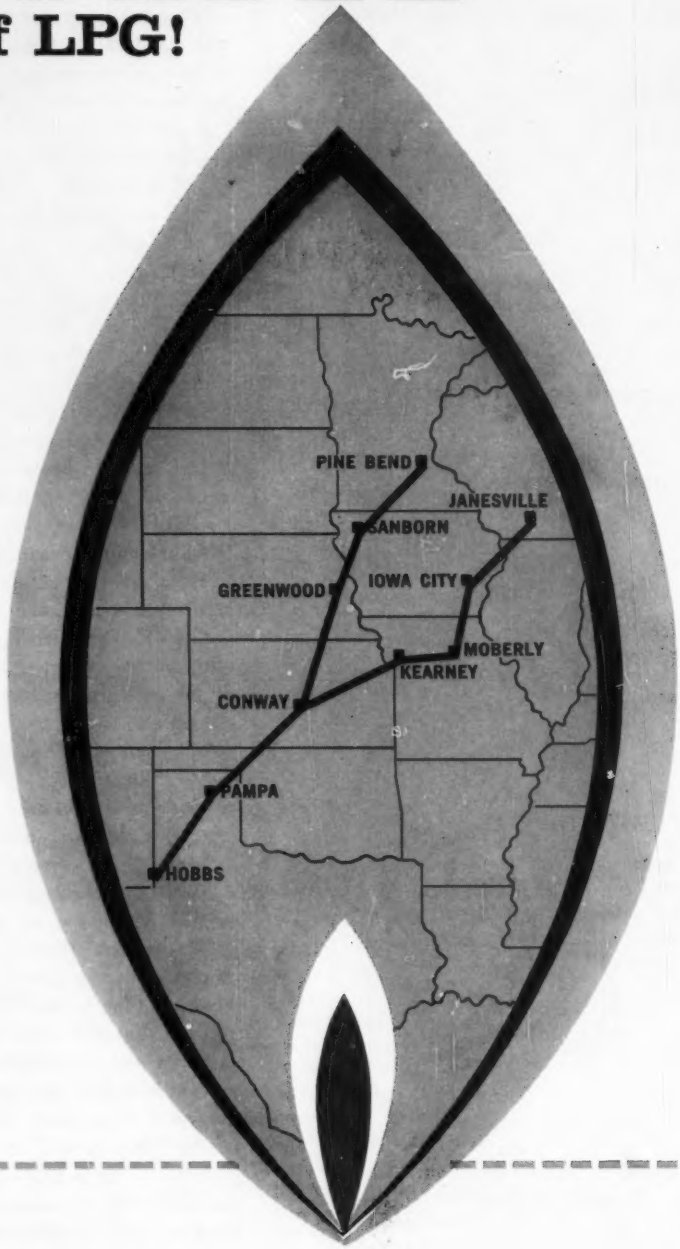
Even if this is true—and perhaps these speculations are far too pessimistic—it is no cause for despair. We can work to solve our problems, learn to adjust to those that cannot be solved.

For this we need your best thinking. We invite you, as industry leaders, to share your observations with us on the above 14 issues or others that may strike you as even more pressing. Published either as letters or incorporated in our frequent special reports, they may help to regild the "Golden '60s" that seem—for the moment, at least—to have lost some of their glitter.

Mid-America brings the upper mid-west a DEPENDABLE supply of LPG!

Propane and its relatives, the wonder-working Liquified Petroleum Gases, have been working a quiet revolution in America's heartland. By providing an economical, clean-burning fuel in transportable form, LPG has brought convenience and modernization to millions of farms, homes and industries. And now Mid-America Pipeline Company adds the one virtue which had been lacking: a dependable supply line, with an initial pumping capacity of 50,000 barrels of LPG a day) and a design capacity of over 85,000 barrels a day) in any kind of weather!

This dependable, large-scale source of supply is ideally suited to the job of furnishing raw materials for petrochemical plants throughout the mid-west. If you've been operating (or contemplating) a petrochemical plant in the Mid-America region, we invite you to call us!



MAPCO

MID-AMERICA
PIPELINE COMPANY

1437 SOUTH BOULDER AVENUE • TULSA, OKLAHOMA

LETTERS

Per Year, Not Per Day

TO THE EDITOR: We were very pleased that your West Coast office was represented among those touring our Torrance hydrogen plant.

In your report of NASA's contract awarded to Linde Co. for liquid hydrogen supply over the next five years (*Dec. 17, '60, p. 22*), we note what apparently is an error in conversion figures for the capacity of the . . . plant. The daily production capacity at Torrance is 13,000 lbs. of liquid hydrogen. Your figure of 4.5 million lbs. . . . is apparently intended to indicate annual production rather than daily production.

R. H. WARREN
Linde Co.
New York

National Phosphate

TO THE EDITOR: In your article "Moving to the Market" (*Nov. 26, '60, p. 154*) you refer to the National Phosphate phosphoric acid plant in Marseilles, Ill. . . . In the description of plant facilities, you mention the new type of conveyor used to elevate the rock. This conveyor is actually installed in the rock storage area, while standard-type bucket elevators are used to elevate the rock, both in the grinding plant and in the digestion section.

The closed water system used by Chemico for this plant is not intended to eliminate air pollution, which is taken care of by Chemico scrubbers, but rather to provide means to reduce the flow of waste water from the plant and the neutralization steps required for such waste water before it is discharged into the river.

E. PELITTI
Chemical Construction Corp.
New York

Polycarbonate Data

TO THE EDITOR: . . . Here at the Business School . . . our group . . . has chosen polycarbonates as the subject of our report.

Because of the newness of this resin, we are having some difficulties in obtaining data about it. . . . We hope your readers will respond to this letter and send us any and all information they might have concerning polycarbonates. We need data about R&D being done now, marketing, fabricating, end-uses, problems with the material and potential future uses. . . .

DAVID E. MILLER
Chase D-44
Harvard Business School
Boston 63, Mass.

Forth's Family Tree

TO THE EDITOR: An item in the Nov. 26 issue's foreign news roundup section (*p. 44*) erroneously states that British Hydrocarbon Chemicals Ltd. will build a styrene monomer plant in South Wales. Actually, the new plant will be built by Forth Chemicals Ltd., Britain's largest manufacturer of styrene monomer. Forth, in turn, is jointly owned by British Hydrocarbon and Monsanto Chemicals Ltd. of London.

EDWARD B. SEATON
Assistant General Manager
Overseas Division
Monsanto Chemical Co.
St. Louis, Mo.

MEETINGS

Synthetic Organic Chemical Manufacturers Assn., luncheon meeting, Hotel Roosevelt, New York City, Jan. 10.

Packaging Institute, symposium, at Northwest Canners and Freezers Assn. annual convention; theme: "New developments in packaging and containers"; Portland, Ore., Jan. 10.

Instrument Society of America, winter instrument-automation conference and exhibit, Sheraton Jefferson Hotel and Kiel Auditorium, St. Louis, Jan. 17-19.

Society of Plastics Engineers, annual technical meeting, Shoreham and Park Sheraton hotels, Washington, D.C., Jan. 24-27.

Soap industry convention (soap, detergents, glycerin, fatty acids), Waldorf Astoria Hotel, New York City, Jan. 25-27.

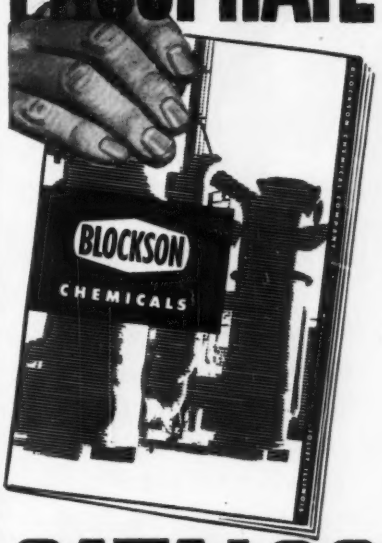
American Chemical Society southeastern Texas section, fourth biennial symposium on hydrocarbon chemistry, Shamrock Hilton Hotel, Houston, Jan. 26-27.

Plant maintenance and engineering show, International Ampitheatre, Chicago, Jan. 30-Feb. 2.

American Society for Testing Materials, committee week. Topic: symposium on fire tests methods (Feb. 1), Netherlands Hilton Hotel, Cincinnati, Jan. 30-Feb. 3.

BLOCKSON

PHOSPHATE



CATALOG

Send for this concise, basic reference data on Sodium Phosphates and other Blockson chemicals. Handy pocket size. Many time-saving tables and charts. Clip this ad to your business letterhead and mail to Blockson Chemical Company, Joliet, Ill.

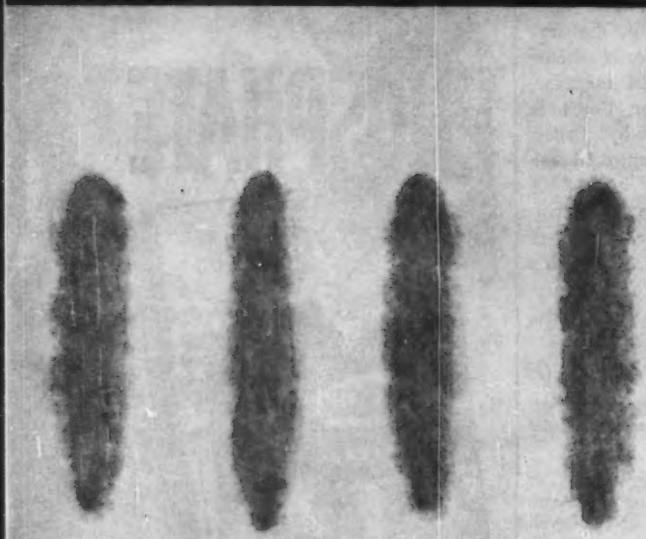
BLOCKSON CHEMICAL COMPANY
Chemicals Division
Olin Mathieson Chemical Corporation

BLOCKSON

SOLVENT and GREASE

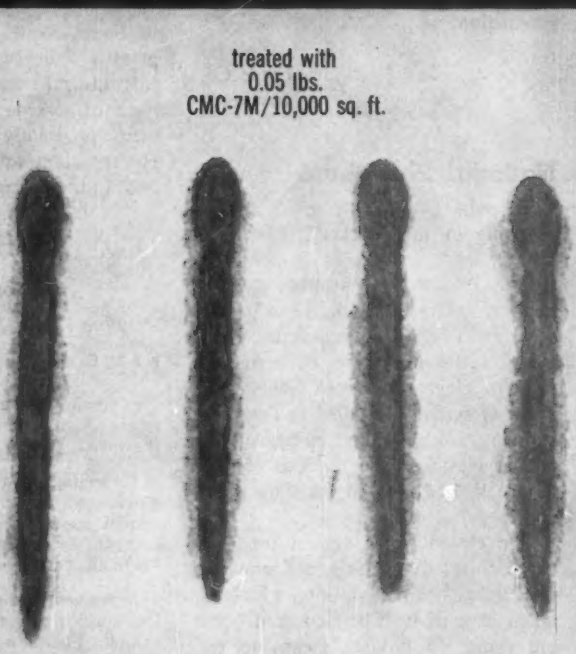
TURPENTINE DROP

UNTREATED BOARD

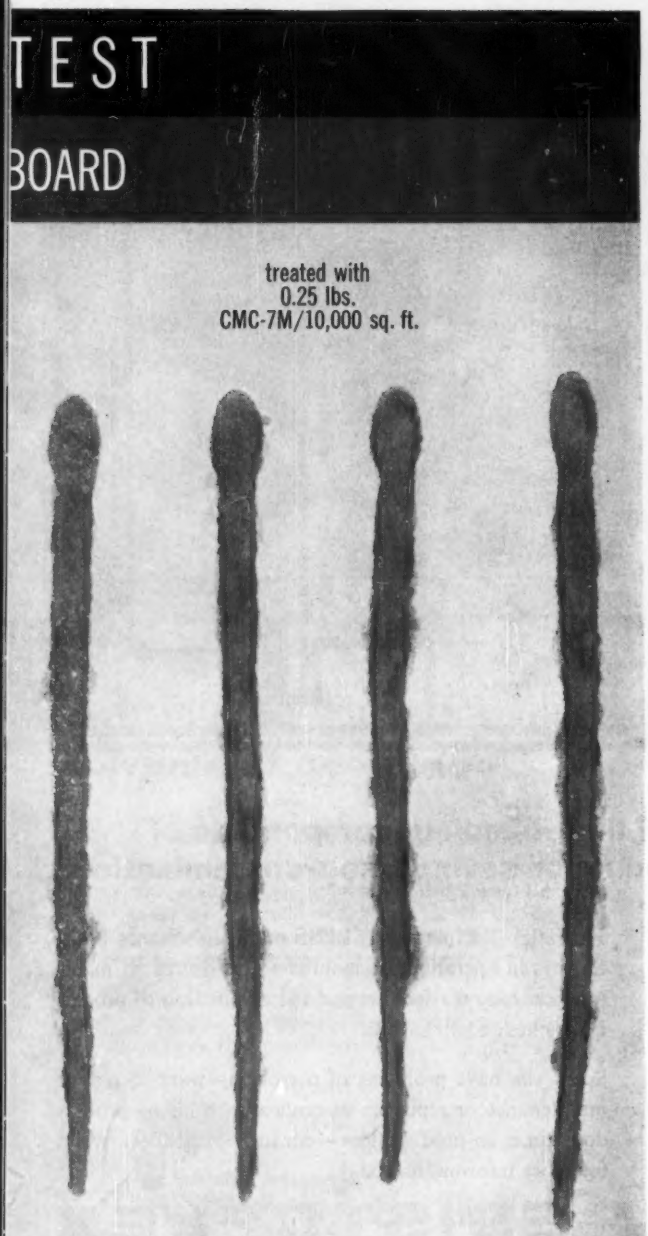


CMC TREATED

treated with
0.05 lbs.
CMC-7M/10,000 sq. ft.



RESISTANCE...



two more "plus" properties of Hercules®

CMC

Versatile is the word for CMC. It's a chemical ingredient that does the job you want, the way you want it done. Take its solvent resistance property for example.

Applied to the surface of paper board as shown in the illustration, Hercules CMC not only imparts grease resistance but can be applied in varying amounts to provide just the degree you want. In printing this means improved results with gloss inks and increased ink mileage. CMC films resist penetration of all oily liquids whether they be paint, cleaning or printing ink solvents, crankcase, flavor or cooking oils.

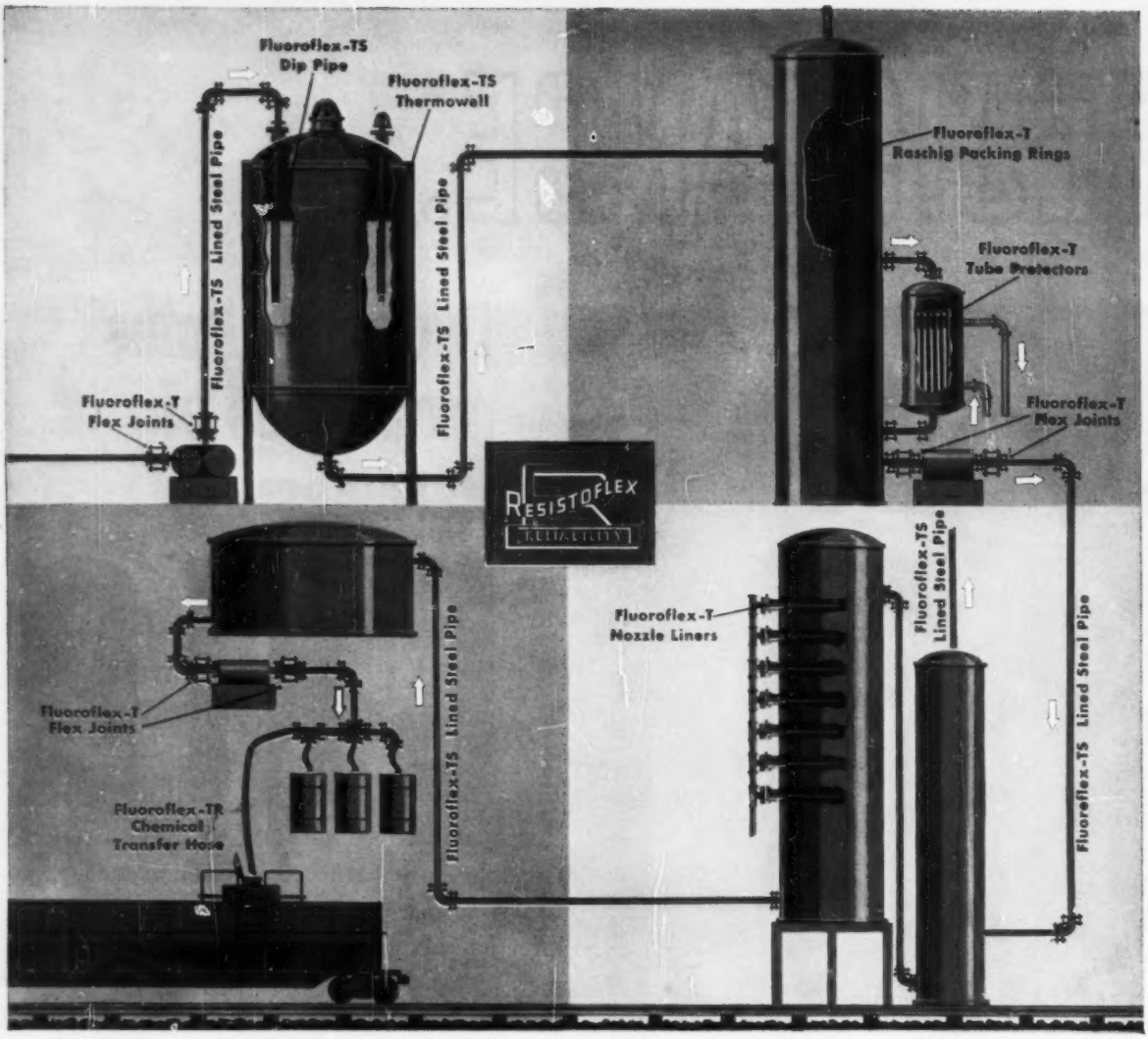
Whether you are seeking solvent resistance or a suspending agent, viscosity control or a deflocculation agent, you'll want to know more about Hercules CMC. Technical data on CMC and its uses is available on request. Write:

Virginia Cellulose Department

HERCULES POWDER COMPANY
INCORPORATED

Hercules Tower, 910 Market Street
Wilmington 99, Delaware

VC61-1



HERE'S WHY corrosion-proof fluid-handling components of FLUOROFLEX-T (TEFLON) assure production savings, non-contamination:

Fluoroflex®-T Piping Products as shown above can be used with complete and proven assurance that they will not corrode or build up solids which can contaminate sensitive products. Specially processed of Teflon® resins by patented Resistoflex methods, they can handle the most difficult materials up to 500°F. They are completely resistant to any chemical except high-temperature fluorine and the molten alkali metals.

Fluoroflex-T Piping costs no more on an installed-cost basis than other corrosion-proof systems in common use today. Initial material costs have been lowered by recent price reductions made possible by advanced technology and increasing volume. Installation costs are inherently low as a result of skillful design which features easily-bolted-together units with prefabricated, flanged sections.

Fluoroflex-T Piping costs LESS on a performance basis. Savings in operation are assured—with decreased maintenance, long service life, and the elimination of process headaches and downtime.

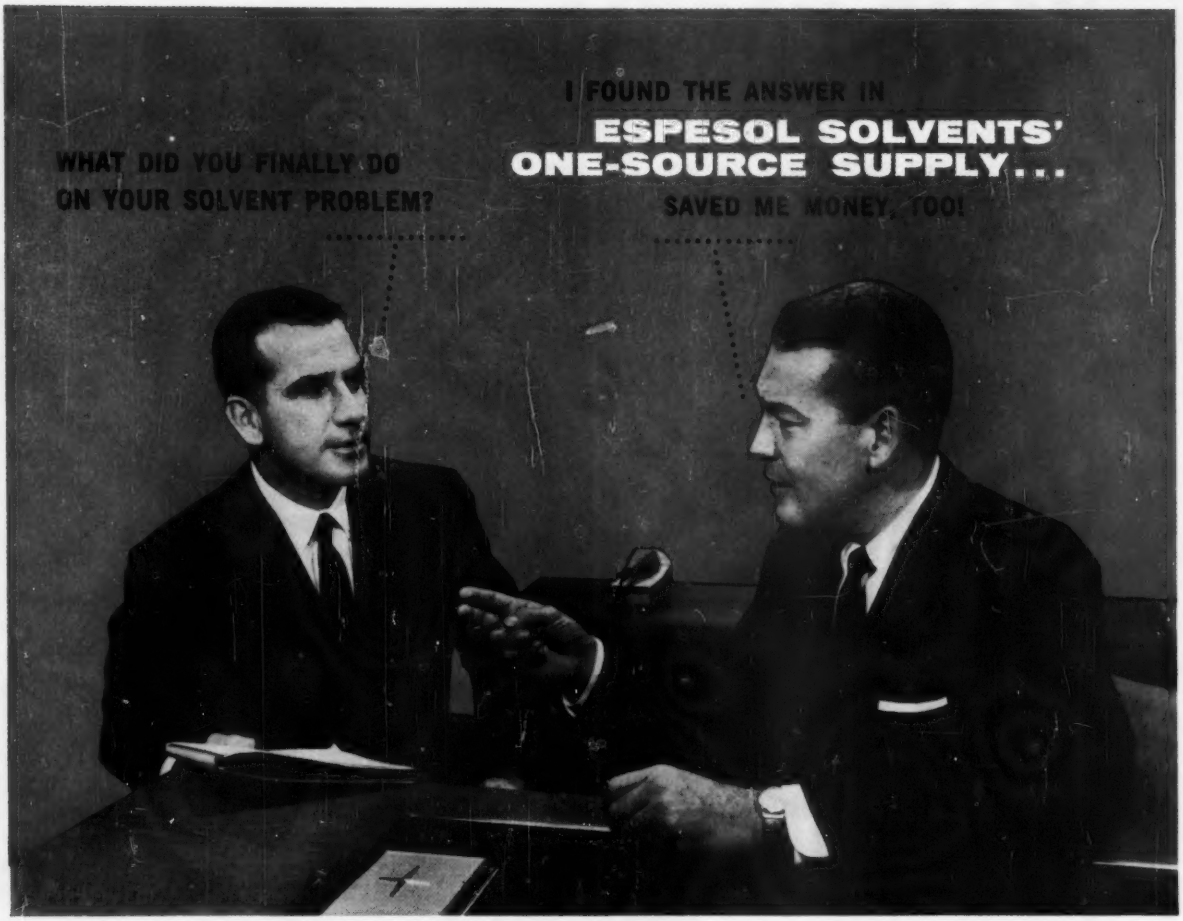
So, if *you* have problems of corrosion—want to reduce maintenance or replacement costs and eliminate process downtime or product loss—consult Resistoflex. Write for more information today.

RESISTOFLEX
CORPORATION

Complete systems for corrosive service

Plants **in Roseland, N. J. • Anaheim, Calif. • Dallas, Tex.**
Sales Offices **in major cities**

®Fluoroflex is a Resistoflex trademark, reg. U. S. Pat. Off.
®Teflon is DuPont's trademark for TFE fluorocarbon resins.


WHAT DID YOU FINALLY DO ON YOUR SOLVENT PROBLEM?
I FOUND THE ANSWER IN
ESPESOL SOLVENTS' ONE-SOURCE SUPPLY...
SAVED ME MONEY, TOO!

Buy all your Aliphatic, Intermediate and Aromatic solvents at one place...at one time! Get these benefits!

- **"Packaged" Delivery Tailored to Your Needs** — Orders for small lots can be combined into a single compartment-lot shipment. Reduces purchasing agents' work, simplifies unloading and handling and insures all products arriving at one time, minimizing production delays.
- **Reduced Freight Costs** — Compartment-lot shipments of smaller, multi-product orders by tank car, transport truck, barge or ship enjoy bulk rates.
- **Lower Inventory Investment** — Now only minimum stocks need be kept on hand — frees capital tied up in unnecessary inventory. Losses from evaporation and other causes greatly reduced. Fresh stock insured at all times.
- **Immediate Delivery** — Signal's nation-wide network of conveniently located terminals insure quick delivery to all points.

SIGNAL OIL AND GAS COMPANY ESPESOL PRODUCTS

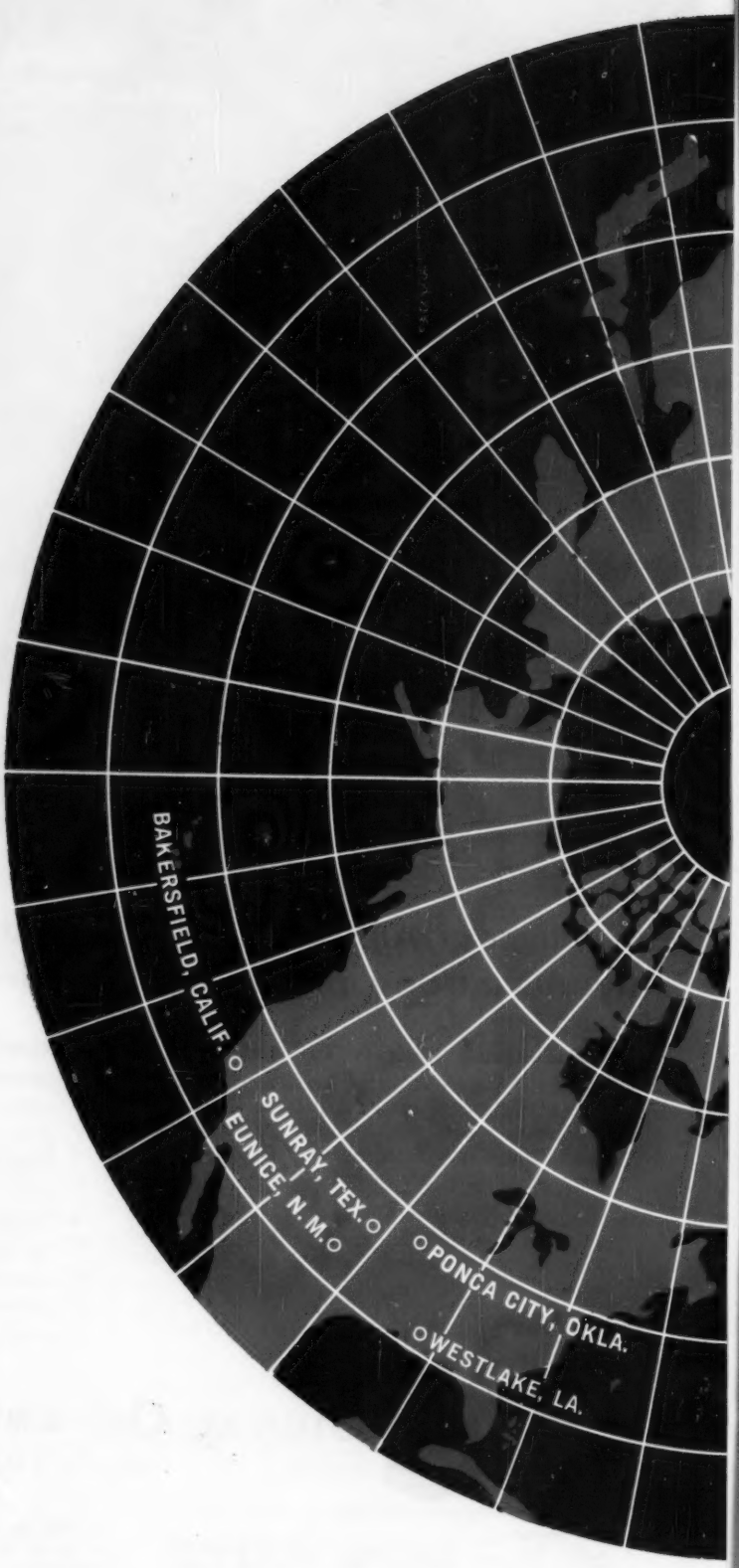
SIGNAL OIL AND GAS COMPANY
HOUSTON DIVISION

U. S. Terminals:
Houston, Texas · Chicago, Illinois · East Liverpool, Ohio
Madison, Indiana · Brownsville, Texas · Savannah, Georgia
Carteret, New Jersey · Los Angeles, California · Richmond, California

European Terminals:
Dordrecht (Rotterdam) Netherlands • Livorno (Leghorn), Italy

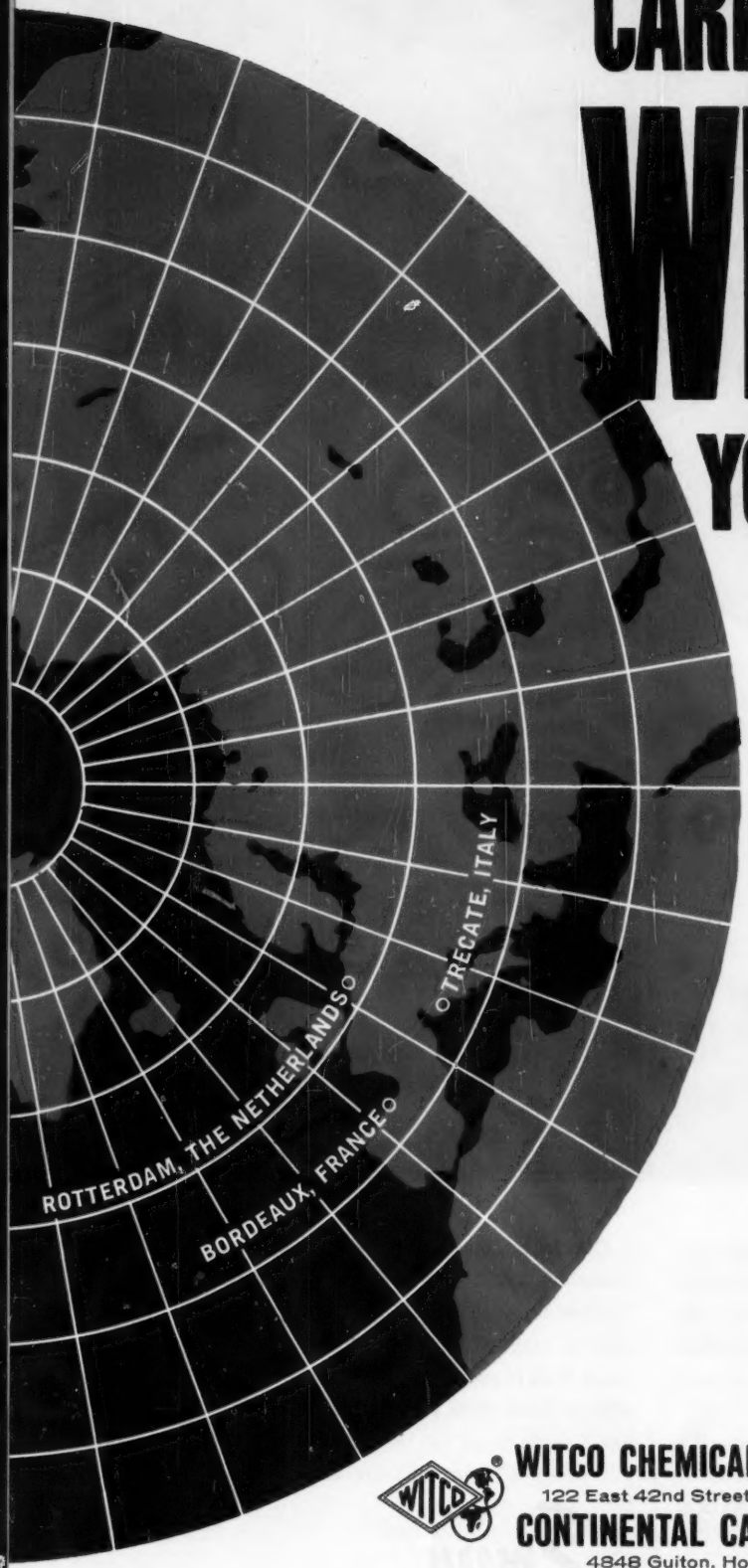
Post Office Box 5008—Houston 12, Texas—Phone WAlnut 3-1651

New York Office: 10 Rockefeller Plaza, New York, Phone Circle 7-2520
Chicago Office: 1515 N. Harlem, Chicago, Illinois, Phone VI llage 8-5410
Cleveland Office: 20800 Center Ridge Rd., Cleveland, Ohio, Phone EDison 3-0188
Louisville Office: 4th and Broadway St., Louisville, Ky., Phone JUniper 3-7634
Atlanta Office: 3121 Maple Drive, N.E., Phone CEdar 3-3227
Long Beach Office: 2828 Junipero Ave., Long Beach, Phone NEvada 6-3301



Sales Offices in: Chicago • Boston • Akron • Atlanta • Houston • Los Angeles • San Francisco • Toronto

CARBON BLACK WHERE YOU WANT IT



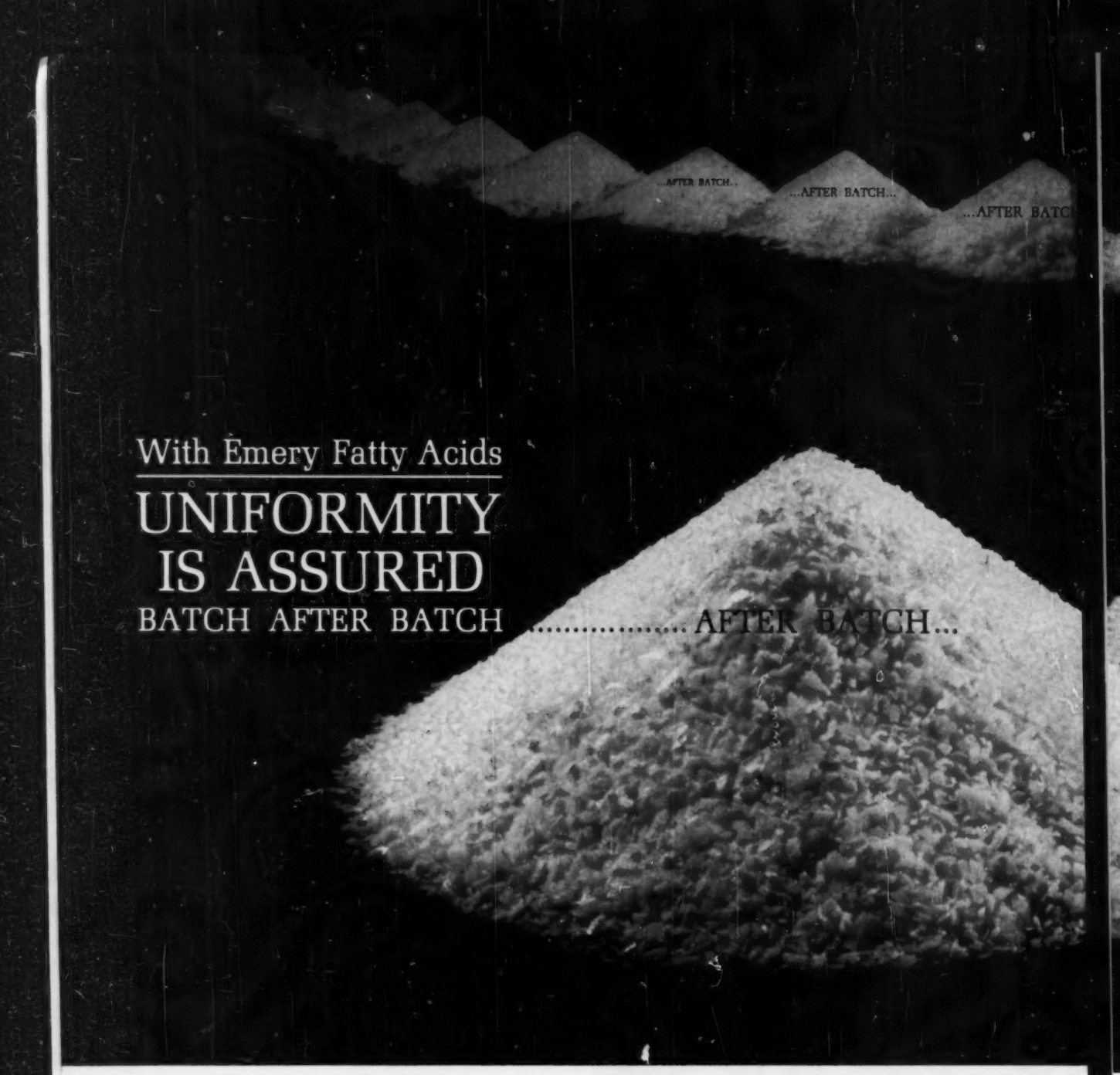
It makes little difference where in the world you are—from Bakersfield to Bordeaux—you are assured of "next door" carbon black service from Witco-Continental's international network of production facilities and sales offices.

Witco-Continental's unique system of "Unified Control" makes this possible. Wherever you are, your requirements are handled by one integrated world organization, to give you the benefits derived from continuous production and quality control, advanced packaging and shipping techniques —without waste motion.

And now, with capacity increased by fifty per cent, Witco-Continental's service is even more readily available —wherever you want it.

WITCO CHEMICAL COMPANY, Inc.
122 East 42nd Street • New York 17, N.Y.
CONTINENTAL CARBON COMPANY
4848 Guiton, Houston 27, Texas

and Montreal, Canada • London and Manchester, England • Glasgow, Scotland • Rotterdam, The Netherlands • Paris, France



With Emery Fatty Acids

UNIFORMITY IS ASSURED BATCH AFTER BATCH

Producing a product of consistent quality (and one with consistent sales appeal) is an easier, less costly job for users of Emery Fatty Acids. This is because these fatty acids offer the highest degree of chemical and physical uniformity from batch to batch—a fact which is convincingly illustrated in the adjoining charts.

Emery achieves this uniformity by a series of quality control checks at every stage of processing, each of which may involve as many as eight different analytical tests.

This kind of quality control in processing gives you assurance of the same fatty acid performance time after time . . . that you will always get full value for your dollar . . . that your product will be uniform, batch . . . after batch . . . after batch.

Checks on a series of 100 consecutive shipments of Emersol® 132 Lily Stearic Acid and of Emersol® 233 LL (low-linoleic) Oleic Acid show how Emery fatty acids always stay within the narrow specifications set for them. This is another example of how Emery Fatty Acids offer you—a little extra everything except price. Why not include these top performers in your formulations? For samples or product literature write Dept. **I-1.**

Emery **FATTY ACID DIVISION**

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Vopcolene Division, Los Angeles—Emery Industries (Canada) Ltd., London, Ontario—Export Division, Cincinnati

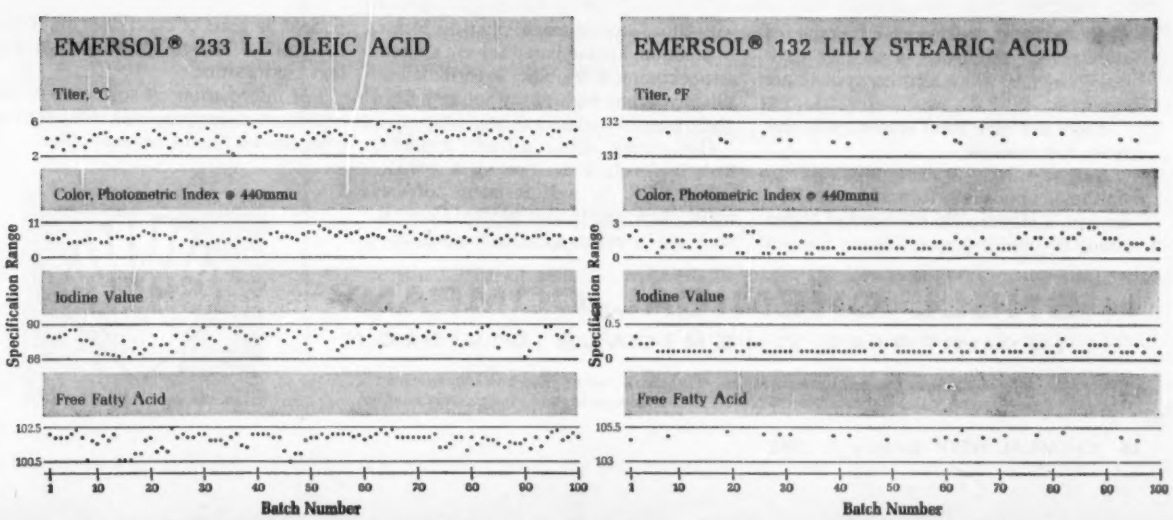
...AFTER BATCH...

...AFTER BATCH...

...AFTER BATCH...

...AFTER BATCH...

...AFTER BATCH...



The KETONE FAMILY

1

ACETONE—low-boiling solvent that permits high solids concentration, particularly useful in high-low lacquer systems. Good for paint and varnish removers.

2

MEK—low-boiling, strong solvency for all resins used in lacquer. Gives low viscosity solutions, high solids concentration, high diluent tolerance.

3

MIBK—medium-boiling with excellent solvency characteristics. Has high tolerance for diluents. Gives solutions of low viscosity and high solids concentration.

4

DAA—high-boiling solvent that improves blush resistance. Excellent for hot lacquers. Ideal for decorative brushing lacquers because of mild odor.

5

EAK—high-boiling solvent, excellent blush resistance, good diluent tolerance, and high solvency for surface-coating materials. Slow evaporation contributes to good flow-out, prevents pinholing and bubbling.

Now—the standard of comparison for lacquer solvent systems . . .

Ketone solvent systems have become the standard of excellence in lacquer technology against which all other systems are measured.

There are very good reasons why this is so. For example:

Ketone solvent systems give superior finishes in almost any formulation at lowest cost. Ketones yield solutions of higher solids or permit greater diluent content with either aromatic or aliphatic solvents. In addition, ketone-based solvent systems assure complete flexibility in formulating. When you buy high-purity solvents from Shell, *you* add the latent solvent *you* prefer.

High-purity, active solvents available from Shell include: acetone, MEK, MIBK, DAA, EAK, as well as latent solvents MIBC, IPA, and industrial ethyl alcohols. Shell also provides technical assistance—backed by years of experience and one of the world's best-equipped surface coatings laboratories.

For information on solvents—or help with formulation problems, write or phone your nearest Shell Chemical office.

SHELL CHEMICAL COMPANY

INDUSTRIAL CHEMICALS DIVISION

Atlanta • Chicago • Cleveland • Detroit • Houston • Los Angeles • Newark • New York • San Francisco
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Montreal • Toronto • Vancouver

SHELL

Business Newsletter

CHEMICAL WEEK
January 7, 1961

Danger signals are going up on the profit trend. Dow Chemical says its September-October-November sales were up 1 to 5%, but earnings dropped "markedly." Ferro Corp. estimates '60 net income at $3.20/-share, down from $4.08 in '59. But U.S. Borax boosted sales 7% and earnings 14% in its fiscal year ended last Sept. 30.

•

More price-fixing suits may be in store for chemical processors. Kefauver's Antitrust and Monopoly Subcommittee is preparing a report on bids submitted to government agencies, chiefly the Defense Dept. and Tennessee Valley Authority. They are said to show patterns of identical bidding for basic commodities, including chemicals, cement and steel.

An injunction against price fixing of drugs has been asked by the U.S. Justice Dept. against the 1,500-member Northern California Pharmaceutical Assn. This follows criminal charges filed against NCPA, charging that it distributed a price schedule, urged members to follow it.

On the state level, identical bids to city, county and state agencies led California's attorney general to charge two liquid chlorine makers and their distributors with price fixing. Named were Tops Chemical Co. (El Monte) and John Wiley Jones Co. (Torrance). This is part of a General California crackdown against price fixing.

In New York state, nine chlorine companies consented to refrain from price fixing in selling liquid chlorine to state and municipal agencies. They are Allied Chemical, Hooker Chemical, Jones Chemicals, Monarch Chemicals, Eastern Chemicals, Collier Chemicals, Ireland Chemical, Stedford Chemical, and Slack Chemical. They were charged with having fixed prices, but were allowed to consent to the judgment without admitting guilt.

•

Watch for International Rayon Corp. to move into new fields. A good bet: polymers. Several years ago IRC's research department strongly recommended branching out into new polymers—but was turned down by Hayden B. Kline, president at that time, who wanted to stick with rayon (he developed the first continuous process for making viscose rayon). Kline later became chairman of the board, has now resigned from that position. He will remain on the board but "devote a greater share of his time to other business and civic interests." The company lost $2.4 million the first nine months of '60, primarily because of price and nylon competition in the tire-cord business.

•

Allied's National Aniline Division will play '61 tight. Says Vice-President Neal Draper: "The coming 12 months generally will see a continuation of strong competition, overcapacity and profit squeezing, with new products offering the greatest opportunity for maintaining profit levels." Another opportunity Allied will take advantage of: cutting costs,

particularly sales expenses. At the same time, National Aniline is continuing with expansion projects in polyethers, isocyanates, and an entry into fine denier nylon.

Another Allied division, General Chemical, apparently has some long-range expansion in mind. It has purchased a 61-acre tract—twice the size of its present site—adjacent to its plant in East St. Louis, Ill. Use of the plot has not yet been designated.

•

The first large-scale plant for sucrose ester surfactants will be constructed this year in either Jamaica or Brazil. The plant, believed to be in the 30-million-lbs./year range, will be built by Ledoga S.p.A. (Milan, Italy), a manufacturer of drugs and chemicals. The company is now turning out modified sugar esters and glycerides in its Garessio, Italy, plant using a new process that reduces the dimethylformamide content of the products. The compounds are used as detergents, as food additives (e.g., to prevent staleness of bread) and as emulsifiers in cosmetics and pharmaceuticals. A Japanese company, Dai Nippon Sugar Manufacturing Co., and a U.S. company, Colonial Sugar Co. (Gramercy, La.), are now turning out sucrose esters in pilot-plant quantities. France's Pechiney Chemical is also reported to be working in this field.

•

Russia has spelled out its chemical output goals for '61, the third year in its seven-year plan to overtake the U.S., industrially. This year Soviet planners expect to increase output of chemical products 14.5%; synthetic resins and plastics 32%; rayon and synthetic fibers 20%; synthetic rubber 33%; rayon cellulose 25%; paper 7%. Barring continued bottlenecks, Russia will pour in 1.3 billion new rubles (official value of the ruble is $1.11 effective Jan. 1) into capital investments in the chemical industry, especially for fertilizers, toxic chemicals, herbicides. Output of chemical equipment is slated to expand 27%. Despite some reported shortcomings, over-all Soviet chemical progress is about on schedule. The seven-year plan calls for increases of 400% in production of both chemicals and artificial fibers, and a 700% boost in plastics.

•

Britain wants to boost its trade and investments in Latin America. To spearhead the drive, it has renamed its Dollar Export Council the Western Hemisphere Export Council, and expanded it to cover Western Hemisphere countries outside the dollar area. Formed in '51, the council has played a substantial part in the resounding success of British exports in the U.S. It's composed of private industry groups, with strong government backing.

•

A new chemical plant in Kilmokea, Ireland, will produce 115,000 long tons/year of sulfuric acid, which will be used for making superphosphates and compound fertilizers, taking ammonia from a planned $19.6 million nitrogenous fertilizer plant in the Midlands. The new plant, due onstream in '63, is backed by Irish, Belgian and Canadian interests.

INDUSTRIAL CHEMICALS

ANHYDROUS AMMONIA – This basic industrial chemical is available in commercial and refrigeration grades from three strategically located plants.

AQUA AMMONIA (NH_4OH) – An economical source of nitrogen and an easily handled alkali.

AMMONIUM NITRATE – In pelleted form. Typical analysis: Ammonium Nitrate content – 96% or more.

AMMONIUM NITRATE SOLUTIONS – NFS-83 and NFS-50. Ammonium nitrate-water solutions containing respectively 83% and 50% NH_4NO_3. For explosives, fluid catalysts, pharmaceutical applications.

AMMONIUM SULFATE – Diverse uses include fireproofing, fertilizers, leather tanning.

ETHYLENE OXIDE – Rocket propellant, fumigant, fungicide, chemical intermediate.

ETHYLENE GLYCOL – Also Di- and Tri-. Humectants, plasticizers, scrubbing solutions for gas dehydration, scores of other industrial uses.

ETHANOLAMINES – MEA, DEA, and TEA. Versatile, reactive, easy to handle. TEA available in 98% and commercial grades.

FORMALDEHYDE – Available as 37% Inhibited, 37% Low-Methanol, 45% Low-Methanol, 50% Low-Methanol.

METHANOL – 99.85% pure. In barge, tank car, and tank-truck quantities.

NITROGEN TETROXIDE – High energy oxidant for liquid rocket propellants. Easy to handle and store.

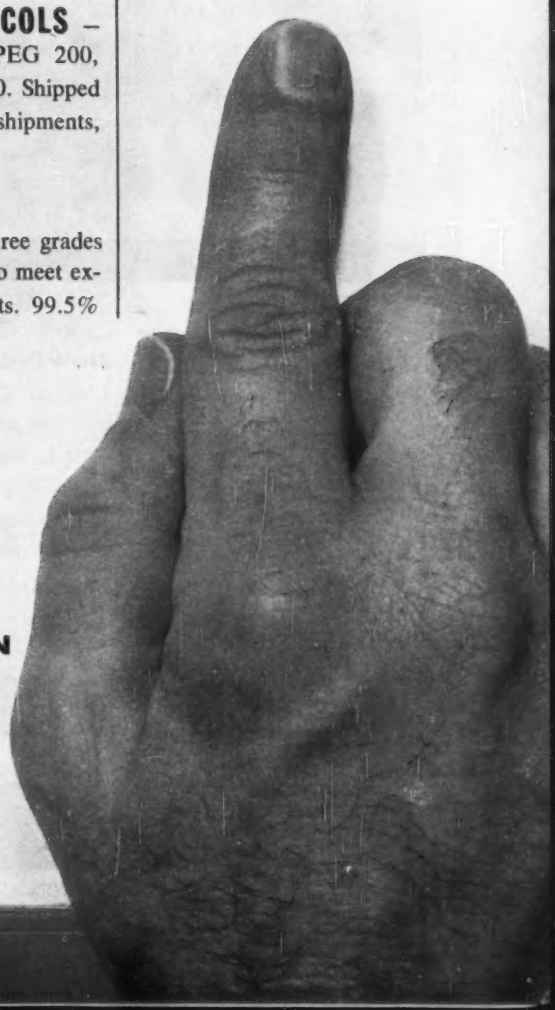
POLYETHYLENE GLYCOLS – Available in six forms: PEG 200, 300, 400, 600, 1000, 1450. Shipped in tank car or combination shipments, tankwagon and drums.

SODIUM NITRATE – Three grades – coarse, medium, fine – to meet exacting process requirements. 99.5% pure.

UREA – Multiplant production assures unfailing supply of this basic chemical in crystal and pelleted form.

U-F CONCENTRATE-85 – Highly concentrated solution of urea (25%) and formaldehyde (60%). Easy to handle, economical source of these materials for resins and adhesives.

For specifications and local offices, see our insert in Chemical Materials Catalog, page 272A and in Chemical Week Buyers Guide, page 27.



BASIC TO AMERICA'S PROGRESS

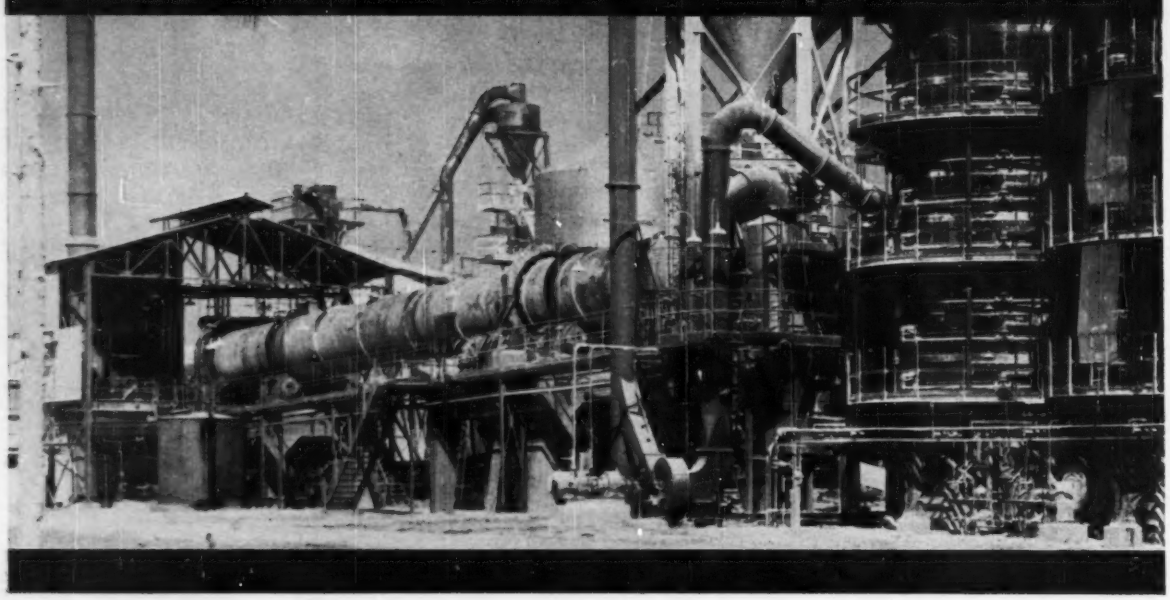
Allied Chemical

NITROGEN DIVISION

Dept. AP 10-7-2, 40 Rector Street
New York 6, New York

2819

Now producing High purity REFRACTORY PERICLASE



Now in successful operation, the seawater magnesia plant of Michigan Chemical Corporation at Port St. Joe, Florida is producing high-purity refractory periclase which meets exacting specifications and is available in lump or crushed form for shipment by rail, truck, barge and ocean vessel.

A complete series of magnesium oxides also is available from the Florida plant as well as from the company's Saint Louis, Michigan unit. If active or light density products are required, these can be supplied from either facility.

For samples, data and prices, phone or wire Magnesia Sales Division, Saint Louis, Michigan — or contact your nearest Michigan Chemical Representative.

M-60-3

MICHIGAN CHEMICAL CORPORATION

708 North Bankson Street, Saint Louis, Michigan
Eastern Sales Office: 230 Park Avenue, New York 17, New York

Copyright 1960 Michigan Chemical Corporation

New Force on Petrochemical Map

Monsanto Chemical is about to start constructing in southeast Texas a massive petrochemical "building blocks" plant—including one of the world's largest ethylene units. This big project—to be onstream sometime in 1962—will be a major integration move for Monsanto, bridging the gap between the oil and gas business of the company's Lion Oil division and the petrochemical end-products manufacturing of its Organic Chemicals and Plastics divisions.

The new plant—whose feedstock requirements are now set at 7-10 million bbls./year of various petroleum and natural gas liquids—will be built on a 3,000-acre site some 25 miles south of Houston on Chocolate Bayou. This tract had been optioned by Monsanto last winter (*CW Business Newsletter, March 19, '60*), and is now being purchased from Houston Farms Development Co.

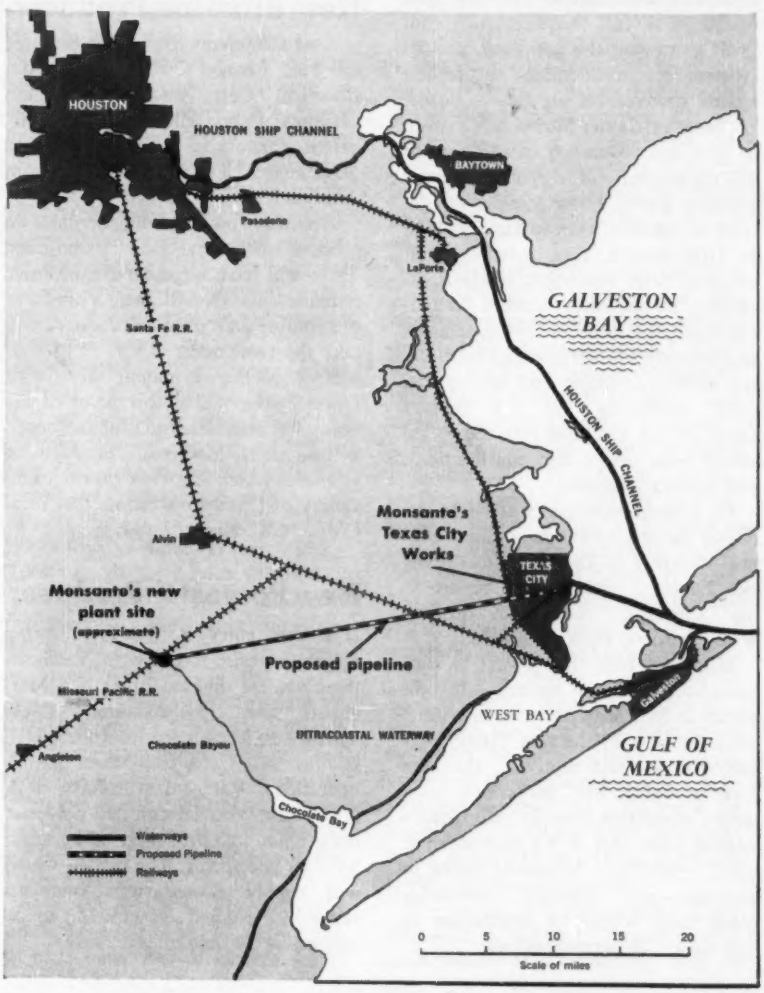
Chocolate Bayou can be used for barge shipping right now, but Monsanto intends to improve the channel by dredging. Last May the company obtained a permit from the U.S. Army's Corps of Engineers for straightening the channel, dredging to a depth of 12 ft., and widening to as much as 100 ft.

Triple Link: However, it's expected that much of the new plant's output will go by direct pipeline to Monsanto's big petrochemical works on the Texas City harbor, some 20 miles to the east (*map, right*).

In fact, Monsanto is planning to build at least three pipelines connecting the two plants. One will carry ethylene, which is used at Texas City to produce polyethylene resins, styrene and vinyl chloride monomers; another will "probably" transport propylene, which could go into polypropylene and numerous industrial chemicals such as acrylonitrile; and the third pipeline will be for hauling various hydrocarbon and derivative liquids in either direction. Conceivably, this could mean that at least a portion of the new plant's feedstock materials may come via pipeline from one or more of the Texas City refineries.

Broad Line: The new Chocolate Bay-

Monsanto's Williams, Eckert: Going basic in major petrochemicals.



ou plant will be a multi-unit complex with a long list of products and coproducts. Principal products and initial capacity figures: ethylene, "more than 500 million lbs./year" (Monsanto says this will make this unit "the world's largest"); benzene, 42 million gal./year; and naphthalene, 50 million lbs./year.

In addition, the plant will turn out propylene, cumene, phenol, acetone, ethylbenzene, ethane, pentane, pentenes, indane, indenes, "and a whole variety of other hydrocarbons" that would be used as raw materials.

Monsanto has been producing up to about 175 million lbs./year of ethylene at Texas City and also has been buying substantial quantities from other producers. Company President Charles Sommer says the new plant will achieve production efficiencies that "will materially strengthen Monsanto's economic position." He says the new plant's output of benzene and naphthalene will not meet Monsanto's full requirements, but "will guarantee the company and its customers considerable protection against unfavorable supply situations."

Guessing Game: Monsanto's refusal to give any indication of the cost of this big project will trigger an industry guessing game. Early guesses on the total investment were running as high as $100 million. This includes acquisition of plant site and pipeline right-of-way, all construction work (including buildings, utilities and pipelines), equipment and instrumentation, channel dredging, design and engineering costs (including fees for Bechtel Corp., which has been retained to assist in both design and construction), and startup expenses.

Its general manager will be H. K. (Griz) Eckert, formerly assistant general manager of the company's Plastics Division, and he will report to the executive committee through Vice-President Felix Williams.

Monsanto calls this project "a precedent-setting move toward self-sufficiency in hydrocarbon raw materials." Because most of the new plant's output will be used captively, the venture probably will not result in a large immediate rise in Monsanto's annual sales. But if it's successful, it could result in a handsome boost in earnings—and possibly encourage other large chemical companies to "go basic" in petrochemicals.

Arkansas's McGowan: For his bromine, a big assured market.

New Bromine Producer

A new company to produce bromine has been formed (50-50) by Houston Chemical Corp. and Great Lakes Chemical Corp. The company — Arkansas Chemicals, Inc.—will build a plant near El Dorado, Ark. Onstream date: early '61.

Houston—now building a plant to produce tetraethyl and tetramethyl lead—will have large captive bromine requirements. Great Lakes, a producer of bromine and bromine products, will take the remainder.

E. T. McBee, managing director of Great Lakes, will be president of the new company. Chairman of the board will be H. D. McGowan, president of Houston, which is a wholly owned subsidiary of Chatham-Reading Chemical Corp. (*CW, June 11, '60, p. 21*).

New Polyester Producer

A new entry in the fast-growing polyester resin industry is Valchem, the chemical division of United Merchants and Manufacturers (New York), best known for its Robert Hall Clothes and Cohn-Hall-Marx plastics operations. Valchem will have a 3-million-lbs./year unsaturated polyester resin plant in production at Langley, S.C., by late spring. The plant—which will supply Southeastern seaboard states—is designed so that it can be expanded to 12 million lbs./year.

More Lawsuits Loom

The year begins with new legal troubles for various companies and individuals in the chemical industry.

Four makers of carbon dioxide and dry ice have been charged with violating terms of a 1952 antitrust judgment that barred price fixing and restrictive agreements in the industry. Charged are General Dynamics Corp., Air Reduction Co., Olin Mathieson Chemical Corp., Chemetron Corp., and four executives: George C. Cusack, president of Airco's Pure Carbonic Co. division; John J. Lincoln, Airco vice-president; and President Rex L. Nicholson and Vice-President Henri C. Mathey of GD's Liquid Carbonic Division. Air Reduction and Liquid Carbonic were parties to the original suit.

The government charges the companies conspired to fix prices and terms of sale, submitted noncompetitive bids to federal agencies, and established geographic price differences and a zone system of pricing. The government says that General Dynamics, Air Reduction and Chemetron also attempted to change the pricing policies of competing producers, to eliminate competitors' sources of supply and distribution outlets, and to restrict the areas of operation of some manufacturers.

Other antitrust action this week further complicated the Union Oil-Phillips Petroleum case. Union Oil, a codefendant with Phillips in a federal antitrust suit, has filed a cross-claim against Phillips. Union wants the U.S. district court at Los Angeles to enjoin Phillips from voting the Union shares it now holds, to prevent Phillips from buying more, and to order Phillips to divest itself of its present holding.

Meanwhile, Robert S. Aries—head of a consulting service in Stamford, Conn.—has new legal problems. Merck & Co. and Rohm & Haas have both entered suits against Aries and a group of Aries companies and associates, charging unlawful acquisition of trade secrets.

The Merck suit asserts that Aries wrongfully gained process data for Amprol, a drug (amprolium) developed to combat infection in poultry. Rohm & Haas alleges that Aries illegally obtained secret information about "unique polymeric materials"

developed by R&H and sold it to competitors.

Aries—who denies all these charges—now faces a criminal indictment from a federal grand jury charging that he received, concealed and stored a quantity of amprolium over a six-month period, knowing "the drug to have been stolen, unlawfully converted and taken." It may be some time, however, before Aries is brought to court. He's now living in Switzerland, a country known for its reluctance to grant extradition.

New Rules for '61?

New local operating conditions for chemical process firms will likely result from expected actions of '61 state legislatures, many of which will convene this month.

State lawmakers will meet in regular sessions this year in all states except Kentucky, Mississippi and Virginia. Part of their work—and this is true in a significant number of states—will be the consideration of proposals for stimulating new plant construction, curbing water pollution, and developing water resources.

More states will act this year to attract new plants by making or guaranteeing loans through state funds or credit. For example, Washington's lawmakers will vote on a proposal to back up new plant mortgages with state funds. Depressed West Virginia will vote on a reorganization of state agencies into a commerce department with an industrial lending agency.

Other states—it's still too early to say how many—will take up legislation to enable cities to issue bonds to finance new industrial construction, lease the plants to private industry.

The other major area of legislation affecting chemical companies will be water. Following the leads of California and Louisiana, which last fall voted for large water projects (*CW Business Newsletter, Nov. 19, '60*), Kansas and North Dakota are among those states ready to consider spending money for more water control and conservation.

New sewage and waste disposal legislation (already under discussion in half a dozen states) will vary from stronger laws against pollution to incentives—such as tax alleviation—for construction of industrial waste treatment facilities.

Green Light in Argentina

The two-year battle over who is to build Argentina's first SBR synthetic rubber plant ended last week when a Texas Butadiene spokesman revealed in Buenos Aires that the company is withdrawing from the project "due to economic, financial and technical reasons." A group headed by Fish Engineering now has a clear field.

The Fish project still has not received final official approval. But approval, probably within the next few weeks, is almost a certainty. The project will cost about $70 million. Location: about 350 miles north of Buenos Aires, at San Lorenzo.

This is the site of the government's refinery, and the terminus of the Fish-built liquid-products pipeline from Campo Duran, which will provide feedstock for the new complex. Fuel will come from another Fish-built pipeline—the natural gas line that runs from Campo Duran to Buenos Aires.

Under the terms of a government decree, the Fish group will have to complete construction of the project's "first phase" within three years after it is finally approved. The basic unit will be a reformer and aromatic unit, to produce motor fuel and benzene. The group will turn the fuel back to the government, purchasing only the benzene—enough to supply all of Argentina's needs (now imported) and the needs of the plant.

Other units will produce 35,000 tons/year of butadiene, 25 million lbs./year of carbon black, and 15,000 tons/year of styrene, of which about 7,000 tons will be used captively to make the synthetic rubber.

The complex will produce about 45,000 tons/year of rubber — about 10,000 tons of polybutadiene and 35,000 tons of SBR-type. With Texas Butadiene out of the picture, the group plans to sell all the rubber in Argentina, at world prices.

First-phase plans also include a 1,290-bbls./day aviation alkylate plant, using isobutylene separated out of the butane feedstock. This part of the project is tenuous; since the plans were first drawn up, the increase in jet plane traffic has helped shrink the alkylate market.

When the Fish group presented its plan to the government in August, the first phase was also to include facilities for producing rubber antioxidants, called "a logical addition to the complex." Now, however, a Fish spokesman says this has been dropped because it didn't fit into the raw-material picture. The plant will be built elsewhere in Argentina by U.S. Rubber, one of the group's partners.

Ultimately, the complex will produce caprolactam, dodecylbenzene, propylene, ethylene, plasticizers and other products.

To finance and operate the complex the Fish group has formed a new subsidiary, Petroquimica Argentina S.A. (PASA). Although Fish has been the prime mover in the project, it holds only a 15% interest. Continental Oil, Cities Service and U.S. Rubber each hold 24%, and Witco Chemical has a 13% interest. Fish will handle the construction, and each of the partners will contribute technology along with capital.

Bundle of Troubles: The history of the competition between Fish and Texas Butadiene is complex and still rather obscure (*CW, Sept. 10, '60, p. 33*). Texas Butadiene's main reason for withdrawing: inability to make financing arrangements for some $39 million.

But there is strong evidence that Texas Butadiene's path was also blocked by a change in the government's attitude on the project. Fish's project has some solid economic advantages—it is close to industrial consumers, fuel and feedstock sources.

But when Fish in '58 first proposed building an SBR plant at San Lorenzo, the government rejected the idea because it wanted a plant to be built in the underdeveloped Southern region, where it had pledged industrialization. Texas Butadiene's proposal fulfilled the government's wishes, and it won a preliminary government decree.

Since that decree was issued in Sept. '59 Texas Butadiene won a contract from the provincial government by which the latter agreed to supply water and utilities and to build a 123-mile fuel pipeline. The plant was to be built in two stages, with butadiene being shipped in until local gas fields could provide raw material.

But in the last few months Texas Butadiene's troubles mounted. The government was unhappy that it

planned to import the butadiene, even though the government couldn't guarantee adequate raw-material supplies and services for "some years." Moreover, the provincial government never started building the pipeline or dam, as it had promised. On top of all of this, political unrest in the province resulted in the suspension of the governor with whom Texas Butadiene had been negotiating.

The decree for Fish's project, finally issued in Feb. '60, did not provide for an SBR plant. But Fish forced the issue in August, when it submitted its formal proposal for a complex that included the SBR plant. Fish held that its costs would be lower, proposed the government allow both plants to compete.

Texas Butadiene's parent; Cabot Corp., also planned to build a carbon black plant north of Buenos Aires. Its status is now uncertain.

But Koppers, which was to supply the styrene, is going ahead with its plans. It has already broken ground for a plant at its La Plata complex, expects to use part of the output in its local polystyrene plant and sell the rest to Monsanto's polystyrene plant, and to local producers.

Although there are a number of reasons why Texas Butadiene's project foundered, a basic one would seem to be timing. Fish itself concedes that much of Argentina's future petrochemical development will be in the south, where Texas Butadiene proposed to put the rubber plant. Texas Butadiene's main problem was, evidently, that industrialization of Argentina's southland is still several years off.

New U.K. Drug Rules

Britain's Ministry of Health has revealed its modified voluntary price-control scheme. It regulates National Health Service prescription sales, which total about $112 million/year. Sales by subsidiaries of U.S. companies account for more than half of this total.

The new plan weakens the link between export and domestic prices. For a drug's domestic price to be based on its export price at least 25% of its sales must be in exports, instead of the previous 20%. And if the government is dissatisfied with a price based on the export price it can now negotiate a change with the manufacturer. Hitherto only the manufacturers could institute negotiations. This is expected to be the most significant of the changes.

In addition a formula with lower maximums has been devised for drugs that don't meet the export pricing test and for which there is no unbranded equivalent. And under the new rules the three-year period of freedom from price control for new drugs will not apply to products that "manifestly owe nothing to fresh research." This closes the loophole that encouraged producers to make insignificant changes in product formulations and promote them as "new drugs."

Better in Venezuela?

Observers see a clear sign that Venezuela's darkened prospects for foreign investors may be brightening: last week Reynolds Metals Co. and the Venezuelan government concluded a 50-50 deal to construct a $30-million aluminum reduction plant.

Initial plant capacity will be 25,000 tons/year, of which about 80% will probably be consumed in Venezuela.

The project—the country's first aluminum smelter—is the first step in the government's plan to industrialize the Caroni region of southeastern Venezuela. It will draw low-cost power from the government's hydroelectric generating facilities.

The smelter had been long in the talking stage, first by France's Pechiney, then by Reynolds when Pechiney dropped out. It has been under sharp attack in the Venezuelan Congress, where leftists called it "a sellout to imperialists."

Reynold's success in concluding the deal—and the government's ability to carry it off—is expected to encourage other U.S. investors who have been holding their plans in abeyance until Venezuela's stormy political situation clears up.

Lack of confidence in President Romulo Betancourt's ability to control the rising tide of leftist agitation and his government's heavy budget deficit have given foreign investors pause and spurred a flight of capital, which reached an estimated $600 million before the government imposed currency exchange controls in November.

The government plans to liven business with a new "expansionist" program, which includes easier credit, new revenue measures, and spending cuts. But before many investors get enthusiastic, they will wait to see who comes out on top in the inevitable showdown between Betancourt and the radical Left.

The leftists have been quiet in the weeks since December's rioting in Caracas. But they are expected to foment new disorders early this year.

EEC Takes a Step

After settling some dangerous wrangling, the six members of the European Economic Community took the first steps on Jan. 1 in their plan to achieve a common market far ahead of their original schedule (CW, July 16, '60, p. 100). For outsiders, these steps will produce the first serious sting of tariff discrimination.

Under the speedup plan, the member nations trimmed their tariffs against each other by 10%. They also made the first adjustments in their tariffs against nonmembers in line with the schedule that leads toward a common external tariff. Both moves were a year ahead of the original schedule. In general, Italy and France lowered their outside tariffs slightly, while West Germany and the Benelux countries raised theirs.

To ease the impact on outsiders, these adjustments were made on the basis that the ultimate common tariff would be 20% lower than originally planned. On a typical chemical, for example, France lowered its tariff to 24.6% instead of to 29%, while the Benelux tariff went up to 7.1% instead of to 8%. But this concession to outsiders is conditional. It will be rescinded if mutual concessions are not extended at this month's session of the General Agreement on Tariffs and Trade organization.

The speedup plan was almost shattered by a disagreement between the Germans and the Dutch over agricultural tariffs—a disagreement that threatened the future of the Common Market. By settling it with a compromise the Council of Ministers eased the task it faces when it meets in June to decide on further speedup plans. And it gave encouragement to Common Market supporters.

national roundup

Rounding out the week's domestic news.

Companies

Chemetron Corp. (Chicago) has purchased Northwest Chemical Co. (Detroit), a 28-year-old producer of chemicals for the metalworking industry. It will now be operated as a part of Chemetron's Chemical Products Division.

In another move last week Chemetron began shifting its Girdler Process Equipment Division's executive, sales and engineering staffs into new offices at the same site as the division's plant in Louisville, Ky.

Pittsburgh Coke & Chemical Co. is selling its Green Bag Cement Co. subsidiary to Marquette Cement Mfg. Co. (Chicago) in exchange for 150,000 shares of Marquette common stock. Pitt Coke management plans to hold the stock as an investment, says this move will enable the company "to concentrate funds and management attention on other fields."

Kerr-McGee Oil Industries (Oklahoma City) and Pacific Uranium Mines Co. (Beverly Hills, Calif.) are merging. Under the plan approved by stockholders of both companies, one share of K-M stock will be exchanged for each 20 shares of Pacific Uranium. Thereafter K-M will be sole owner of Kermac Nuclear Fuels Corp., which holds an estimated 20% of all known U.S. uranium reserves and operates what it calls the nation's largest uranium processing plant.

Interchemical Corp. (New York) is acquiring The Landers Corp. (Toledo, O.), a producer of combined and plastic-coated fabrics for autos and furniture.

Federal Chemical Co.'s (Louisville, Ky.) merger with National Distillers and Chemical Corp. has been approved by Federal and is expected to take effect early this month (*CW Business Newsletter, Sept. 10, '60*). Stockholders of Federal—which produces mixed fertilizers at six plants in Illinois, Indiana, Kentucky, Ohio and Tennessee—last week ratified the proposal to exchange all of Federal's outstanding stock for about 250,000 shares of ND&C common stock.

Expansion

LPG Hydrocarbons: Shell Oil Co. plans to build two new natural gas processing plants in southeast Texas. One, at North Rincon Field, will process up to 35 million cu.ft./day of raw gas, recovering 15,500 gal. of propane, 14,000 gal. of heavier liquid hydrocarbons, and 7,900 gal. of gasoline. A plant at Sealy Field will handle up to 16 million cu.ft./day of raw gas, recovering 6,300 gal. of propane, 8,600 gal. of depropanized gasoline, and 6,000 gal. of distillate. These will be the first plants in the Houston area to use hot-oil heating, rather than the usual steam for stripping. Advantages claimed: lower installation and maintenance costs.

Tungsten Carbide: Metal Carbides (Youngstown, O.) plans to take a 15-year lease on a tungsten carbide unit to be built by local businessmen at Murfreesboro, Tenn. The 6,000-sq.ft. plant—to be in production by next fall—will center around an electric furnace unit.

foreign roundup

Rounding out the week's international news.

Formaldehyde/Netherlands: Netherlands State Mines, which is building a phenol plant with Dow, now will build the first formaldehyde plant in Holland—a 25,000-tons/year unit at Beek. Since the plant is designed to produce more than Holland consumes, part of the output will be exported.

Boric Acid/France: Societe Europeene du Bore (Seurobor) has been formed as an equally owned subsidiary by American Potash & Chemical and the French company Ugine to build a $2-million boric acid plant at Ugine's boron derivatives facilities near Lyons.

Alcohol/U.K.: Imperial Chemical Industries (London) will boost its total alcohols capacity to over 140,000 tons/year by adding a fourth, 30,000-tons/year olefin carbonylation unit and by expanding existing butyl and isobutyl alcohol plants. The company plans to expand its polyvinyl chloride capacity from 70,000 to 80,000 tons/year by midyear.

Titanium Dioxide/Australia: Laporte Industries Ltd., a British company, will build a 10,000-long tons/year titanium dioxide plant at Bunbury, Australia. It's due onstream by '64, using locally produced ilmenite.

Caustic, Chlorine/Germany: Knapsack-Griesheim, wholly owned subsidiary of Farbwerke Hoechst, will build a $5-million caustic-chlorine plant at Knapsack, near Cologne. It's slated to begin operations this summer, about the same time its plant for processing ethylene into acetaldehyde starts up.

Pharmaceuticals/Italy: Commercial Solvents has picked up an 80% interest in two affiliated Italian pharmaceutical producers, Hoffmann-Lampis and Fiart. It has also set up an international subsidiary to handle its "expanding foreign operations," which now account for about 10% of CSC's total sales.

GOOD LOW-TEMPERATURE PROPERTIES
with FLEXOL epoxy plasticizer EP-8

Want good performance in your vinyl film at low temperatures? Specify CARBIDE's FLEXOL EP-8 — the highest-purity, low-temperature epoxidized plasticizer-stabilizer commercially available.

FLEXOL EP-8 (2-ethylhexyl epoxy tallate) gives good flexibility at temperatures as low as −40°F., and without premium price. Low-temperature properties of this material are comparable to more expensive adipate, azelate, and sebacate plasticizers.

High oxirane oxygen content and low iodine value make EP-8 outstanding for compatibility and sunlight stability.

Compounding versatility and plasticizing efficiency of EP-8 are ideal for convertible car tops and seat covers, high-clarity film and sheeting, garden hose, and electrical insulation. EP-8 is also useful as a viscosity depressant and stabilizer for plastisols and organosols.

Film manufacturers gain another important economy from EP-8's low viscosity and low molecular weight. Calendering mills can run through *more pounds of vinyl resin per hour* because of faster solvating and better fluxing of vinyl resins by EP-8.

Ask your CARBIDE Technical Representative for details on FLEXOL EP-8's interesting properties and money-saving, material-replacing advantages—available in shipments from drums to tank cars. Or write: Union Carbide Chemicals Company, Division of Union Carbide Corporation, Dept. HX, 270 Park Avenue, New York 17, N. Y.

UNION CARBIDE CHEMICALS COMPANY

UNION CARBIDE

FLEXOL and UNION CARBIDE are registered trade marks

Washington
Newsletter

CHEMICAL WEEK
January 7, 1961

Revision of patent laws on drugs is in Sen. Kefauver's plans for legislation aimed at bringing down drug prices. Kefauver's ideas aren't firm yet, but he and his aides feel that 17-year patents tend to keep prices high—particularly on the so-called "wonder" drugs.

Patent legislation is touchy. Current U.S. laws grant across-the-board 17-year rights on all patents, including drugs and chemicals, and any effort to alter regulations on specific commodities would run into stiff Congressional opposition.

But Kefauver has alternatives that fall short of outright trimming of the time that drug patents could be effective, say, to five years instead of 17. He could, for example, ask that all drug makers be compelled to license new drugs to other manufacturers for a reasonable royalty. There is some precedent for this. The Atomic Energy Act calls for compulsory licensing; some antitrust decrees include similar requirements.

Kefauver could even call for an outright ban on drug patents, combining this with stepped-up federal inspection procedures. This is less likely, however, since it would take the incentive out of research.

•

The U.S. drug industry staunchly opposes any tampering with patent laws. Some industry groups already are busy studying changes that may be proposed in Congress and are preparing ammunition to counter them.

U.S. patent laws on drugs and chemicals are unique. Many other nations exempt these products from patent regulations—allow either short-term exclusive rights or grant no patents at all.

It's highly unlikely that the U.S. ever would go this far. Most lawyers feel that any law exempting some commodities never would hold up in court. Government ownership of drug patents is another possibility, especially as more and more federal funds are being poured into massive research programs.

Meanwhile, Kefauver's aides stress that he is not considering any measure that would bring drug prices under direct federal control. They say he "is trying to strike at practices that have fostered monopolistic practices from which high prices come."

By eliminating the subject of federal price controls from his docket, Kefauver will thus confine himself pretty much to the field of patents or to promotional "abuses" of trademarked ethical drugs.

•

Democrats will chase down illegal pricing with as much vigor as that evidenced by Eisenhower's agencies. Many of Kennedy's aides feel that monopolistic pricing practices tend to add to the threat of inflation and spur the dollar and gold outflow.

Washington

Newsletter

(Continued)

The balance-of-payments deficit is all tied up in this area. Unnaturally high prices hamper sales of American goods in foreign markets and encourage imports of lower-priced foreign products.

Robert Kennedy, as Attorney General, will get a big assist from the Federal Trade Commission in this drive. Front-runner for Earl Kintner's job as chairman is Paul Rand Dixon, staff director of Kefauver's Antitrust Subcommittee.

Dixon thinks that FTC should be more active in attacking monopolies and believes that laws already on the books are potent enough to do the job. He's an old hand at Robinson-Patman Act violations—discriminatory pricing, discounts and the like. Dixon, like Kefauver, is a wary observer of bigness in business.

•

Premerger notification and pre-price-increase notification are two of the old legislative proposals that are certain to be raised again in the '61 Congressional session. Both have been around for years and observers give them little chance of passage.

The idea of requiring large firms to give the government advance notice of their merger plans actually has more support in Congress than might appear on the surface. But it still would not get far without a determined push from the new Kennedy Administration, which has shown no special interest in the matter.

•

Research and development changes will be slow in coming under the Kennedy Administration. For example, the Pentagon's top R&D man, Herbert York, will remain. And Kennedy is unlikely to add much to the military R&D budget, expected to be boosted by Eisenhower some 10% over the current $4.1 billion.

Incoming Defense Secretary McNamara is wary of Sen. Symington's defense reorganization plan, but will try to bolster York's authority over R&D programs of the individual services.

Kennedy plans to maintain the present separation of military and civilian space programs. But he will make an effort to weed out duplications in research. This may call for a major reshuffling of projects without much of an increase of expenditures.

Air Force-NASA rivalry over development of super rocket boosters will be eliminated. Eisenhower's final budget calls for a 20% increase for NASA. Kennedy agrees.

•

New shipping standards being approved by the Maritime Administration are designed to apply to standard-size shipping containers. The new container sizes will be adopted eventually by rails, ships, trucks. The container dimensions agreed upon will be 8x8-ft. cross-sections in lengths of 10, 20, 30 and 40 ft. Final approval by the American Standards Assn. is expected within a few months.

para tertiary amyl phenol
di tertiary amyl phenol

para tertiary butyl phenol
2, 4 di tertiary butyl phenol

2, 4 di tertiary amyl phenol

NEW "SINGLE-SOURCE SERVICE" ON ALKYLATED PHENOLS

Koppers, long a basic supplier to resin producers, now adds a *complete* line of alkylated phenols to its list of chemicals for this industry. Now you can buy all the varied components listed above from *one* supplier.

Whatever your particular needs, Koppers can meet them. Available (flaked) in 50 lb. bags or 100 lb. drums; (liquid) in 55 gal. drums, tank truck or tank car quantities.

Like to check our quality? Samples are available on request. Use the coupon or call Koppers Company, Inc., Tar Products Division, Pittsburgh 19, Pa.

KOPPERS
COAL CHEMICALS

Koppers Company, Inc.
Tar Products Division
Pittsburgh 19, Pa.

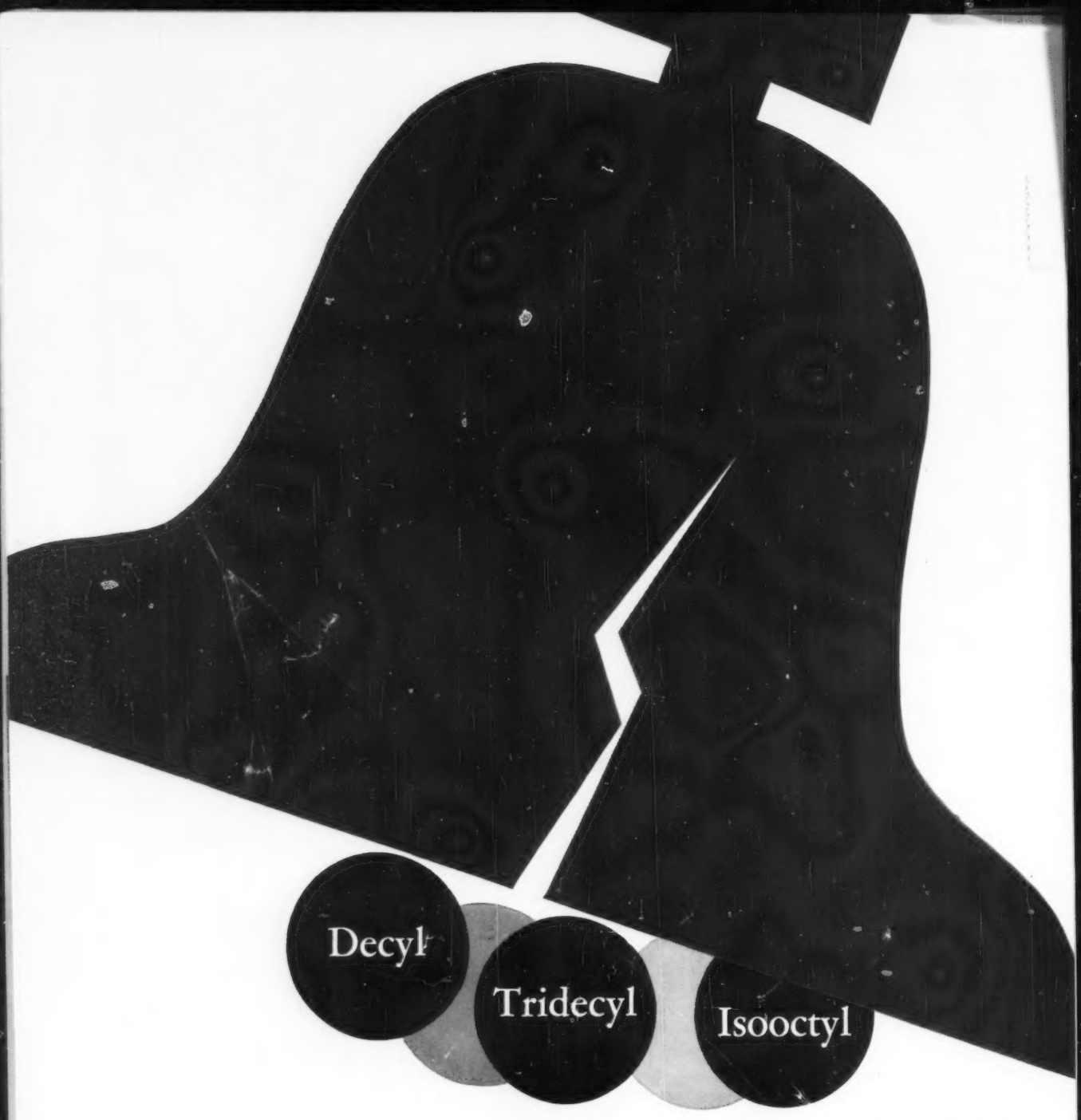
Gentlemen:
I'm interested in your "single-source service" on alkylated phenols.
☐ Please send samples ☐ More information

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____



Soon . . . oxo alcohols from Gulf's new plant at Philadelphia

When Gulf's new Philadelphia oxo plant goes on stream early this year, you will have a new source of *isooctyl, decyl and tridecyl* alcohols — today's key building blocks for vinyl plasticizers, detergents, synthetic lubricants and countless other exciting new products.

This facility was designed to produce all three of these oxo alcohols to standards that have made Gulf petrochemicals pacemakers in the industry. The plant's strategic location means faster deliveries to your doorstep . . . its capacity can supply your largest volume needs.

So, however you make or use any kind of alcohol-based product, you'll find Gulf's expanded oxo alcohol capacity much to your liking. You can get additional information at our Sales Office, 360 Lexington Ave., New York 17, New York.

GULF

Quality Petrochemicals to Begin with

Benzene • Cyclohexane • Ethylene • Oxo Alcohols • Propylene • Propylene Trimer and Tetramer • Sulfur • Toluene

Petrochemicals Department, Gulf Oil Corporation, Pittsburgh, Pennsylvania

A leading producer's polystyrene price lineup for '61*

	Clear or Natural (any quantity)	VIP** Color	Special Color Prices (pounds) 20,000 and over	10,000-19,000	5,000-9,999	3,000-4,999	2,000-2,999
General-purpose	$0.19	$0.21	$0.23	$0.25	$0.30	$0.40	$0.50
Light-stablized	0.21	0.23	0.25	0.27	0.32	0.42	0.52
High-heat	0.22	0.24	0.26	0.28	0.33	0.43	0.53
Medium-impact	0.21	0.23	0.25	0.27	0.32	0.42	0.52
High-heat	0.23	0.25	0.27	0.29	0.34	0.44	0.54
High-medium-impact	0.23	0.25	0.27	0.29	0.34	0.44	0.54
High-impact	0.275	0.295	0.315	0.335	0.385	0.485	0.585
High-heat	0.285	0.305	0.325	0.345	0.395	0.495	0.595
Extra-high-impact	0.38	0.40	0.42	0.44	0.49	0.59	0.69

*Bag prices per pound. **Volume inventory production.

Polystyrene Price Dilemma

The past month's topsy-turvy polystyrene price situation will take another twist this week, as Dow's new —and relatively higher—price schedule (table above) goes into effect. Industry reaction to the move is still inconclusive, and producers will be moving material at split prices until the situation gels.

Other companies were still figuring out their next moves when checked by CHEMICAL WEEK. Most are not completely satisfied with the Dow schedule, but they do favor the higher prices for the natural and crystal-type materials. Not one major producer, however, had reported it would follow Dow's lead—all preferred to see how the situation works out.

Adding to the confusion is the hodgepodge of prices for the many grades and colors of material being sold. In addition, there are special options that enable consumers to obtain an extra price-saving.

For one thing, the Dow schedule is simpler, since quantity discounts on natural or crystal, and VIP* colors are eliminated; and there are no direct-shipment discounts when material is ordered in volume direct from the plant.

Crystal vs. Color: Although this simplified procedure is welcomed by the industry, making comparison between it and the industry's current prices is difficult. But by focusing on crystal or natural material and the VIP colors, some of the problems the industry will be facing during the next few weeks do show up.

On the crystal and natural material, Dow's prices will be somewhat higher, depending on volume bought. Since the new price eliminates quantity discounts, both the bag and boatload prices will be the same. Current industry prices are ¾-1¢/lb. lower than Dow's (*see table*) for volume purchases, with higher tags graduated for the smaller volumes. The discrepancy of ¼¢/lb. is based upon direct-shipment allowance for truckloads. Material is being quoted at 18¼¢/lb., but if the customer buys a truckload direct from the plant, and places his order 15 days before delivery date, he is allowed a ¼¢/lb. reduction.

Since the rest of the industry is using the quantity discount system, Dow's prices will be higher for material sold in volumes above 5,000 lbs. For smaller quantities, Dow's price is lower.

Dow's VIP colored material, on the other hand, is somewhat cheaper than the price being quoted by the rest of the industry. Again, these are sold on a bag or boatload single price basis.

Colorful Confusion: One of the big problems in the polystyrene industry is the proper scheduling of production. When an order comes in for a special color, machinery must be shut down and cleaned before the new run can be made. To overcome this problem and at the same time reduce costs, Dow has introduced the VIP series.

Some other companies have similar plans, but these usually apply only to high-impact grades of plastic. Thus Dow's price for VIP colors will be lower than some prices offered by others in the industry, since it will be below the 20,000-lb. price other producers will be quoting on their equivalent color lines. And, since customers will no doubt take advantage of this lower price, confusion is sure to result.

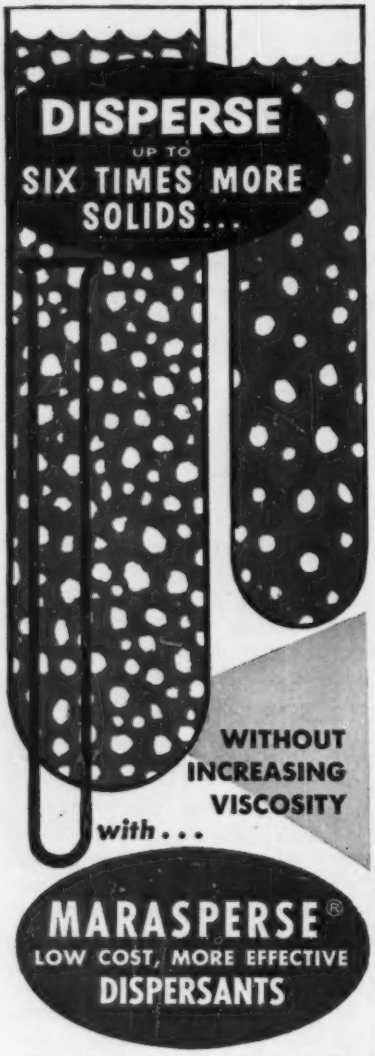
In addition, Dow's tabs for special colors—i.e., those made to customers' specifications—will be somewhat higher than competitors'. This also should confuse buyers and sellers.

Competition and Healthy Growth: The new Jan. 1 price schedule is the latest in a series that have hit the industry during the past month. As a result, tags have been slashed more then 16%, dropping from 21.5¢/lb. to 18¢/lb. for general-purpose material. Other grades have had similar cuts.

Foster-Grant initiated the first drop when it moved prices downward for general-purpose to 19¢/lb. A special customer "performance award plan" that gave an additional saving of 1¢/lb. if the customer met certain requirements was also put into effect (*CW Market Newsletter Dec. 3, '60*).

Monsanto almost immediately drop-

*VIP is Volume Inventory Production: single-color formulation combinations manufactured in sufficient volume per production run to permit economies. Orders received that permit VIP production will be listed each month, and further orders will be accepted prior to the scheduled run, provided the amount ordered is released within a 90-day period.



The addition of only .05% to 3.0% of Marasperse disperses insoluble particles in water suspension and prevents agglomeration.

Viscous pasty masses become thin free-flowing fluids . . . Settling of suspended solids is prevented or greatly retarded . . . Slurries are kept fluid even with greatly increased concentration of solids.

Marasperse dispersants are non-hygroscopic, free-flowing powders.

Use the coupon below for additional information and samples.

MARATHON
A Division of American Can Company
CHEMICAL SALES DEPARTMENT
MENASHA, WISCONSIN

MARATHON
A Division of American Can Company
CHEMICAL SALES DEPT. • MENASHA, WIS.
Please send Information File No. W-11 ☐
Samples ☐ of MARASPERSE for use in
_____
NAME_____
COMPANY_____
ADDRESS_____
_____

ped prices to 18¼¢/lb. for general-purpose, with the additional ¼¢/lb. allowance for direct from plant truckload shipments, when the order is placed 15 days or more before delivery date.

Meanwhile, Dow met competition, although it did not post any new schedule. When it finally revealed its new posted prices, they were lower than the previous ones, but still higher, in some cases, than those being used by the rest of the industry.

Behind all this maneuvering is some intense price competition from many smaller producers in some areas of the country, notably the East. All prices are f.o.b. plant of origin, with transportation allowed.

Why Fight It: Why is Dow bucking the downward price trend for natural, crystal and some colors? W. R. Dixon, general sales manager, believes the recent low prices cannot be justified, feels they are unhealthy for both the fabricators and the suppliers.

"Our customers are affected just as much as we are," he points out. "The margin between prices for the fabricated products and costs shrinks when raw-material prices are dropped, since the majority are virtually restricted to a fixed percentage mark-up or value-added concept in setting their prices. In addition, research and technical service—two important aspects of any healthy industry—both suffer."

It is because of these two factors that Dow believes it may be able to restore a somewhat higher general price for the industry.

The effect of the past month's price cuts can be seen from a quick calculation. Assume that demand in '61 will remain about equivalent to '60's, approximately 725 million lbs. Assuming an average loss of about 3¢/lb. on each transaction, the industry stands to drop $2-2.5 million in sales revenue. Of course, some producers feel that the lower prices can stimulate an increased demand to offset this loss.

There is little doubt that under the present arrangement, the industry will have a big headache trying to figure selling prices for each product. And until it finally decides on one of the two current schedules, or perhaps adopts a third, there will be little prospect of relief from the present confusion.

SODIUM SULPHATE

(Anhydrous)

SALT CAKE

PRIOR CHEMICAL CORPORATION
420 LEXINGTON AVENUE
NEW YORK 17, N. Y.

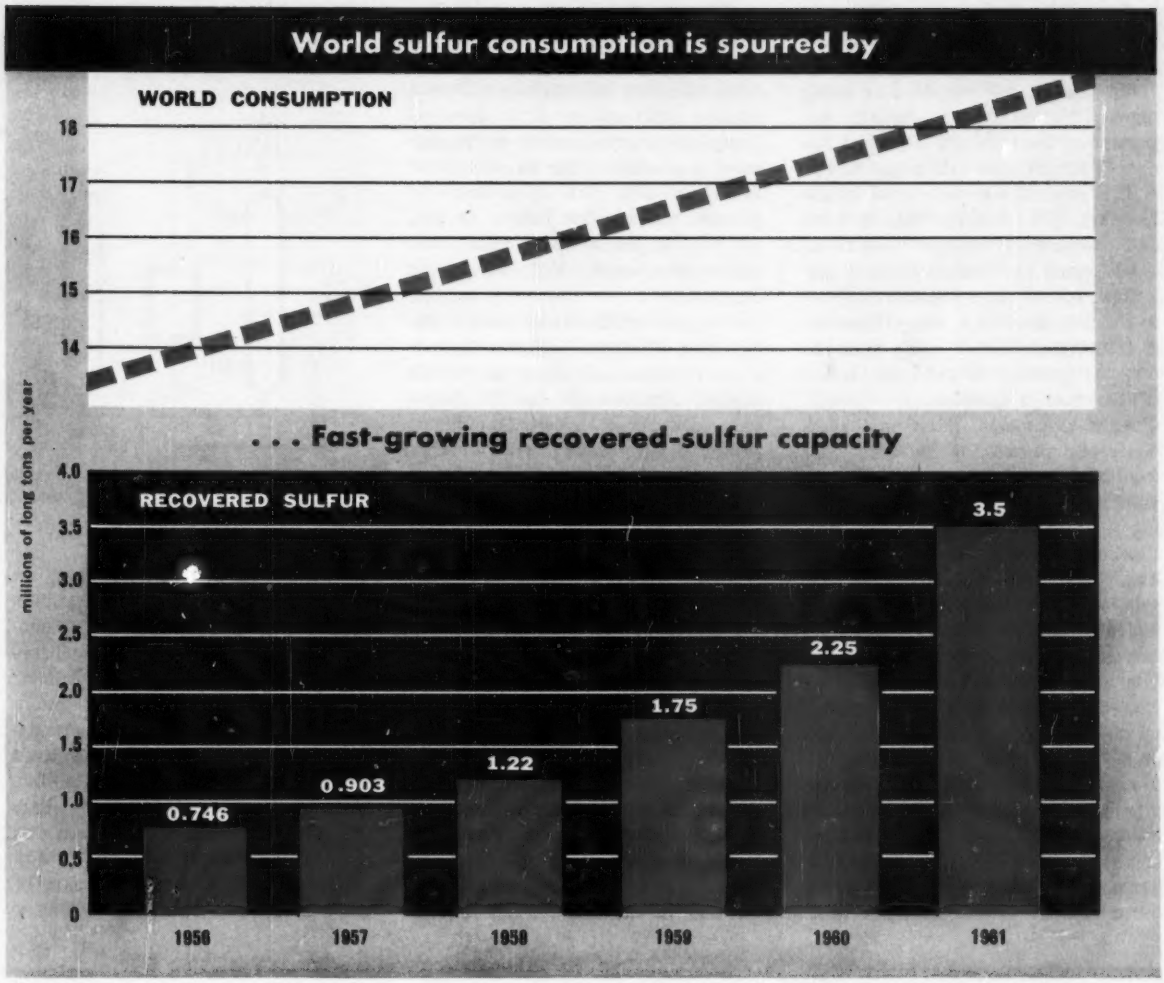
DOES YOUR PRODUCT REQUIRE A WAX WITH THESE QUALITIES?

- ☑ Hardness
- ☑ Low cost
- ☑ Solvent retention
- ☑ Emulsifiability
- ☑ Chemical Inertness
- ☑ Water insolubility
- ☑ Solubility in hot solvents
- ☑ Ease of Saponification
- ☑ Compatability with dyes and other waxes
- ☑ Electrical insulating capacity

Then RIEBECK ROMONTA® MONTAN WAX

Is the wax you're looking for! This remarkable wax can be economically adapted for your industrial and manufacturing requirements. For Free Sample and specifications, write today to:

STROHMEYER & ARPE CO.
Dept. C, 139 Franklin St., N.Y. 13, N.Y.



Sour Gas Shift Spurs New Sulfur Processes

Production of sulfur recovered from natural gas and refinery off-gas* is expanding at a rate of almost 40% per year, while world sulfur consumption is expected to grow at an overall rate of about 4%/year. A growing proportion of recovered sulfur comes from sour gas (see chart)—and a rash of new processes have been developed for refiners and natural gas producers who would like to turn a profit from cleaning hydrogen sulfide out of their gas products.

In contrast with the classic Claus process (used in all but one of the current U.S. plants), most of the new processes are one-step: they convert hydrogen sulfide directly into sulfur as it is absorbed out of the product gas stream, whereas the Claus process takes its hydrogen sulfide feed gas from a sweetening unit (first step) and converts it into elemental sulfur by burning and catalytic conversion (second step). Characteristically, the feed gas to Claus units is regulated to about 50% hydrogen sulfide, while the one-step processes may receive a feed gas containing from a few grains to 50% sulfide per 100 cu.ft.

Two of these one-step processes that are currently attracting attention:

(1) The Stretford process (*CW Technology Newsletter, Nov. 5, '60*), designed to absorb hydrogen sulfide from fuel gases with a solution of anthraquinone, which then oxidizes it to sulfur and water. This process was jointly developed by Clayton Aniline Co., Ltd. and the North Western Gas Board of Manchester, England. It is currently operating in two English plants, where it is sweetening gases that contain 100 grains of hydrogen sulfide per 100 cu.ft. (at Rochdale) and 30-40 grains/100 cu.ft. (at Whitchurch). Patents have been applied for, and six British companies are interested in licensing.

(2) The Haines process (*CW Tech-*

* The chart above was based on data compiled from the 80-85 units throughout the world recovering elemental sulfur from sour gases. Figures through '60 are actual; those for '61 are projected on the basis of plants recently started up or scheduled to start next year.

nology Newsletter, Sept. 24, '60), which uses three beds of synthetic zeolite operating in parallel. One bed absorbs hydrogen sulfide from the main gas stream while the second is being cooled and the third is being regenerated with sulfur dioxide. Regeneration converts the absorbed hydrogen sulfide into sulfur and water.

This process was developed in the Houston, Tex., laboratories of Krell and Associates. Canadian patent rights are assigned to Western Sulphur Recovery, Ltd. (Calgary) and U.S. rights to Sulphur Recovery, Inc. (Houston). A 100,000-cu.ft./day pilot plant to test the process is currently under construction in Houston.

Another process, the Giammarco-Vetrecoke process, is the only one-step commercial-scale route currently used in the U.S.; it has been operating since last spring at Transwestern Pipeline Co.'s plant in Fort Stockton, Tex. This process absorbs hydrogen sulfide or carbon dioxide in an aqueous solution of arsenic trioxide, caustic soda and a catalyst. The solution oxidizes the hydrogen sulfide to free sulfur and water. It is regenerated by air-blowing, and the sulfur is separated by flotation and filtration.

Purity and Profits: In spite of the interest in recovered sulfur, the new processes will have to clear some hurdles before they can score in the race for profits. Output data show world sulfur markets are suffering a glut, which is not expected to disappear until about '65.

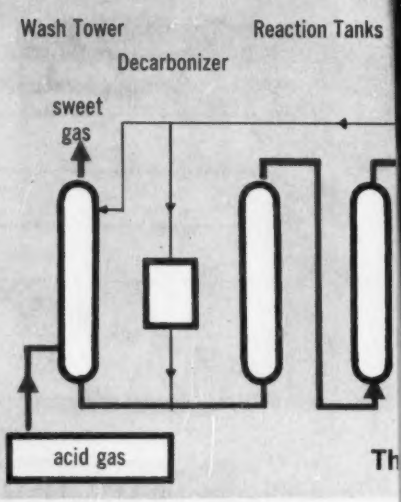
Competing with Frasch sulfur, which is supplying about 35% of the total, recovered sulfur producers must offset excessive freight charges. Frasch sulfur, produced in large amounts along coastal areas, where barge shipment is available, can be shipped at minimum cost. But by-product recovered sulfur must follow its acid gas feed to the source, consequently absorb frequently high rail-freight charges.

For large producers of natural gas who can afford to stockpile, there is a compensating advantage in sulfur's relative inertness. It can be stored as a solid for long periods outdoors without deterioration; this is what Canadian and U.S. producers are doing (*CW, Nov. 26, '60, p. 26*). And since hydrogen sulfide must be recovered both from the hydrocarbon sales gas and from the stack gases to prevent air pollution, most operators are willing to stockpile.

Another hurdle for the new processes—purity—will therefore be the test for commercial success. Both Frasch sulfur and Claus sulfur are extremely pure, giving a product that is bright yellow in color and contains less than 0.1% contaminants.

The Stretford Process: The most significant news about the Stretford process is that it has been successfully operated in the two English plants.

Stretford Process Key: Liqu



Its operating principle—liquid-phase oxidation of hydrogen sulfide with a quinone—is not new. A U.S. patent (No. 2,819,950) was assigned to Texas Gulf Sulphur in '58 for a similar process developed by R. A. Patton. But while previous liquid-phase oxidation processes have been hampered by the formation of colloidal sulfur, which was difficult to separate from the absorbing-oxidizing solution, the Whitchurch plant claims no buildup of sulfur after a year's operation of the process—clearly indicating that it

DIMENSION

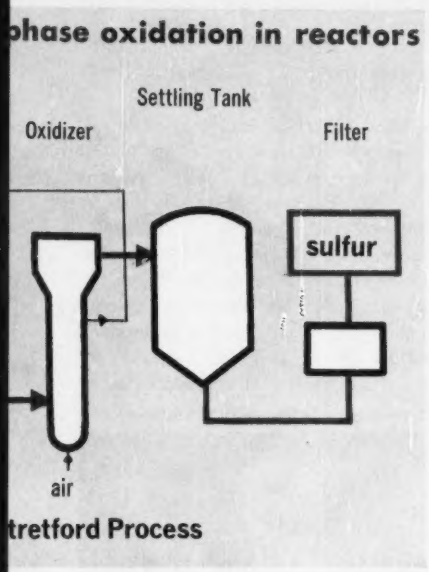
The flowsheet for a typical Claus process sulfur plant is shown on p. 35. Exact process designs vary with local requirements and the sophistication of the designer, but in general a hydrogen sulfide-rich acid gas is first burned in a furnace and then passed over bauxite catalyst for nearly complete conversion into elemental sulfur.

Although hydrogen sulfide can burn to form free sulfur and water, furnace reactions are more involved, converting only about 37%, with the rest going to carbonyl sulfide and sulfur dioxide. And the effluent must be further converted for the 90-97% yields of modern plants.

Both conversions actually involve five simultaneous equilibrium reactions; their rate depends on temperature —so they can be promoted in a certain order. First, hydrogen sulfide and carbon dioxide tend to form carbonyl sulfide and water in the furnace at 1800 F, and sulfur reacts with oxygen to make sulfur dioxide. Then, carbonyl sulfide and water react to hydrogen sulfide and carbon dioxide over bauxite at 500-750 F. Finally, hydrogen sulfide and sulfur dioxide form sulfur and water over bauxite at 400-500 F, while hydrogen sulfide and oxygen form sulfur and water at relatively low temperatures.

Based on these reactions, Claus plants use two fundamental principles. First, the ratio of air to acid gas in the furnace is carefully controlled to give complete combustion without excess oxygen. Second, the temperatures in the catalytic converters must be carefully controlled to obtain the desired reactions. The number of converters is basically a problem of economics.

Modern plants include these design features: The furnace is separated from the boiler, is baffled inside to control the point of combustion. The steam boiler is designed to avoid cold spots and acid corrosion. Some sort of preheater is put in upstream of each converter to control temperature (most ingenious preheater, credited by others to Parsons, is a small acid gas burner feeding directly into the effluent gas stream). Sulfur is condensed in two stages, the first a vertical shell-and-tube unit, the second a molten sulfur wash tower. And an incinerator is used to burn trace components in the stack gas.



has licked the colloid problem.

In the process, acid gas feed enters the bottom of a conventional absorber made of mild steel, with wood slats or Raschig-ring packing. Here it is washed with a descending stream of anthraquinone disulfonic sodium salt made by reacting soda ash with anthraquinone disulfonic acid. Sweetened gas containing less than one part per million of hydrogen sulfide leaves the top of the absorber while the rich solution passes out the bottom to the reaction tanks (*see flowsheet, above*).

In the reaction tanks, the carbonyl radical of the anthraquinone reacts with the hydrogen sulfide to produce free sulfur and the corresponding hydroquinone. The solution is then pumped into a mild-steel oxidizing tower through injectors that entrain enough air to oxidize the hydroquinone back to the original anthraquinone.

Free sulfur from the oxidizing tower then passes through a settling tank to either a rotary vacuum filter (Rochdale plant) or a centrifuge (Whitchurch plant) for washing, to remove traces of the quinone solution, and drying.

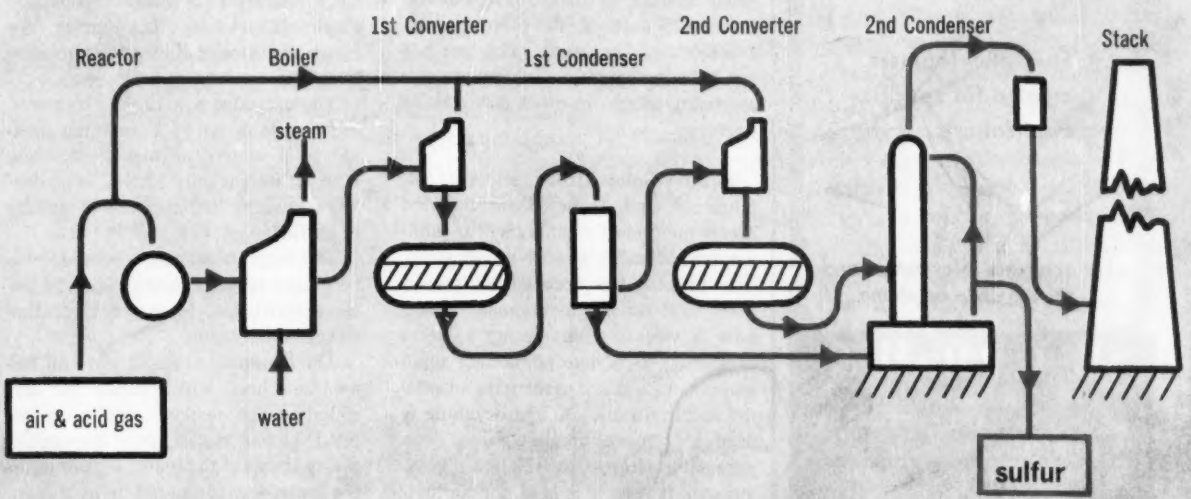
The Haines Process: The Haines process side-steps two potential disadvantages of the one-step processes operating in the liquid phase. By operating over a solid catalyst, it avoids the formation of colloidal solutions of free sulfur, and it avoids contamination of the sulfur product with organic compounds.

As developed in the laboratory, the process takes the sour gas feed directly into one of three parallel reactors. In the reactor, hydrogen sulfide is deposited on calcium aluminosilicate manufactured in the form of a synthetic zeolite. The sweetened hydrocarbon gases pass out and through a cooler to the second reactor, where they cool the zeolite (still warm from being regenerated). From the second reactor, the sweet gas passes through a cooler to the main product line.

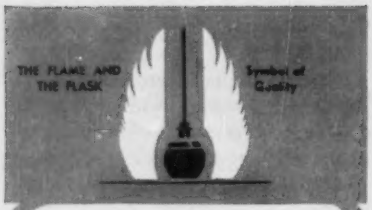
Meanwhile, the third reactor is being regenerated—by burning a part of the sulfur product to sulfur dioxide and sending the hot sulfur dioxide into the third reactor. Here it reacts with the hydrogen sulfide at 600 F to form water and sulfur. Their vapors leave the reactor, pass through a condenser to a settling tank. Molten sulfur from the tank is then pumped partly to the burner, partly to product.

When the first reactor is loaded with hydrogen sulfide, all three are switched. The cooled reactor goes into hydrogen sulfide adsorption; the regenerated reactor goes into cooling; and the loaded reactor goes into regeneration.

Although the one-step processes are inherently cheaper because of their simpler flow schemes and lower operating temperatures, economic estimates for operation in the U.S. are not yet available (Stretford process investment costs are said to be 80¢ "per calorie" in England). To crack the U.S. market, they will have to beat costs for integrated Claus process plants—estimated at about $10,000/-daily ton under 20-tons/day capacity and $5,000 at 200 tons/day. In the meantime, U.S. producers are being cautious. They'll stick by the Claus process until the new processes have proved themselves on a commercial scale.



The Claus Process



Defoamers

HALLCO C-451
HALLCO C-365
HALLCO CPH-4
HALLCO CPH-9
HALLCO CPH-30

- **Non-silicone type: for use in paints, adhesives, starches, paper, latex polymers, coatings, etc.**
- **Excellent compatibility with water or solvent systems.**
- **Special defoamers created for specific applications.**

For complete information and prices, write or phone

The C. P. Hall Co.
of Illinois
CHEMICAL MANUFACTURERS
5251 W. 73rd St., Chicago 38, Illinois
NEWARK • AKRON • CHICAGO
MEMPHIS • LOS ANGELES

PROCESSES

Cracking Rule: A new technical aid, developed by Davison Chemical Division (Baltimore, Md.) of W. R. Grace & Co. and produced by Perrygraf Corp. (Los Angeles), is designed to simplify fluid-cracking-catalyst calculations. The plastic device, available from Davison, can be used to determine: (1) catalyst carbon burning rate and hydrogen/coke ratio directly from a flue gas Orsat analysis; (2) catalyst-bed densities and levels directly from manometer readings; (3) catalyst vessel inventories and addition rates directly from level changes.

•

Trusty Cooler: General Electric Co. Ltd. (London) has demonstrated an experimental thermoelectric refrigerator that promises to operate indefinitely without servicing. The device has no moving parts or chemical refrigerants. Working principle: when direct current is passed through a thermocouple, one junction is cooled and the other is warmed. Many firms have been driving to put this idea into commercial application. AB Electrolux (Stockholm), developing the refrigerator with GE, is now showing a small model in its home city.

•

Uranium Alloy: Metallurgists of the Canadian Dept. of Mines and Technical Surveys (Ottawa, Que.) claim success in using uranium to alloy commercial carbon and low-alloy steels. Results: improved fatigue strength, increased resistance to stress-corrosion and better properties at elevated temperatures. Because of the small amount (0.01-0.05%) of uranium used, cost of the alloy is not substantially increased. The method has been patented in Canada; patents are being sought in other steelmaking countries.

•

Sulfur Gain: Czech scientists R. Klimecek and J. Bettelhein describe a new method of cleaning sulfur dioxide out of sulfuric acid waste gases. The process has successfully passed pilot-plant tests, it is claimed. Here's how it works: a circulating solution of sodium carbonate containing small amounts of sodium pyrosulfite adsorbs the sulfur dioxide. A hydrocyclone is used to remove precipitated sodium pyrosulfite (formed in relatively large quantities), which is sold for agricultural use. Benefits are twofold: (1) sulfur is recovered; (2) air pollution is minimized.

•

Lead Saver: Sodium hydroxide and sodium sulfide in the smelting furnace is the key to the Hungarian Institute for Non-Ferrous Metal Research's (Budapest) new process for recovering lead from spent storage batteries. The novel process recovers 99.7% of the available lead, and the antimony content of the battery lead is maintained almost at its original 7-8%. Spent plates are smelted in two heats. In the

In Hand: Key to Power

Displayed above is a nuclear cartridge that passed ground tests last week as the heart of a nuclear-powered turbojet aircraft engine. It was designed and built by General Electric Co.'s Aircraft Nuclear Propulsion Dept. (Cincinnati, O.) under Air Force and Atomic Energy Commission contracts.

The cartridge has 19 fuel elements, each made up of 93% uranium dioxide in a matrix of nickel-chromium alloy. It weighs only 13 lbs., is equivalent in energy to thousands of gallons of jet fuel.

The aircraft reactor, encased by a beryllium reflector, consists of 150 nuclear cartridges. Hydrated zirconium serves as moderator.

The fissioning uranium gives off tremendous heat, which causes air surrounding the nuclear reactor to expand. The air rushes out of the engine, giving thrust to the plane. Preparations are under way for actual flying studies.

PLASTICS · PAINTS · TEXTILES · WOOD · PAPER

In recent years, antimony oxide has found greatly increased use as a flame retardant in a wide range of flammable materials—particularly plastics. Polyolefins, polystyrene, vinyls, polyesters, acrylates, epoxies and urethane foams are among the plastics in which antimony oxide has been used to provide the necessary degree of safety for consumer products. The application techniques are similar to those long used in paper, wood, textiles, paint, asphalt and rubber.

A bibliography, "Reported Uses of Antimony Trioxide as Fire and Flame Retardant," has been compiled by M&T and is available on request. Offered by M&T are grades of antimony compounds specially made for these applications. Particularly interesting is their range of opacity, permitting optimum formulation when color and appearance is a consideration. Send for technical literature on THERMOGUARD*H, THERMOGUARD*L, and M&T Flame Retarder. These three antimony-based compounds offer a wide range of tinctorial strengths. *Trademark

M&T Chemicals

METAL & THERMIT Corporation, Rahway, N. J. Dept. W

Sn Sb P | inorganics and
Si Ti Zr | organometallics

In Canada: M&T Products of Canada Ltd., Rexdale, Ontario

QUALITY
PLUS
DISTRIBUTION
EQUALS
SERVICE

WHEN YOU WANT THEM...
WHERE YOU WANT THEM...

Imperial Chemical Industries Ltd.

Ammonium Chloride, Grey and White • Ammonium Bicarbonate USP • Ammonium Carbonate • Bleaching Powder Tropical 34%-36% Cl_2 • Calcium Formate • Chlorinated Rubber • Copper Cyanide • Potassium Cyanide • Sodium Cyanide, all grades • Zinc Cyanide • Sodium Aluminate • Sodium Bicarbonate USP and Tech • Sodium Carbonate Monohydrate • Sodium Perborate • Trichlorethylene, all grades • Urea, 46% Tech. • 3,3,5 Trimethyl Hexanol • 2:4 Dimethyl 6-Tertiary Butyl Phenol • Hexachloroethane.

Peter Spence & Sons Ltd.

Aluminum Sulphate, Iron Free • Ammonia Alum • Butyl Titanate • Potassium Alum • Titanium Potassium Oxylate • Cobalt Molybdenum Catalysts.

Deepwater Chemical Co., Ltd.

Iodine, Resublimated USP and Reagent • Potassium Iodide, USP and Reagent • Potassium Iodate, USP and Reagent • Special Potassium Iodide Mixtures • Cupros Iodide, Tech. • Sodium Iodide.

Chemical Manufacturing Co.
INCORPORATED

444 Madison Ave., New York 22, N. Y.
MUrray Hill 8-8700
714 W. Olympic Blvd., Los Angeles 15, Calif.
Richmond 9-7235
114 Sansome St., San Francisco 4, Calif.
YUkon 6-3787

first, the molten lead is mixed with sodium hydroxide, sodium sulfide, charcoal, coke dust, sand, iron burr and limestone. Temperatures are held at 660-750 F. After four hours, a copper-bearing slag is run off the top, more sodium hydroxide and sodium sulfide is added, and the second heat is begun. This lasts about two hours at temperatures of 930-1100 F, after which a second slag, containing arsenic, tin and other impurities, is run off. The lead product from the second heat is then cast into molds.

•

Hot Object: The world's first separate nuclear reactor producing superheated steam will be built by General Electric near its Vallecitos, Calif., boiling-water reactor. Cost of the $8-million superheater will be shared by GE and seven New York state utility companies. Object: to develop a superheat reactor fuel that can improve efficiencies of reactors, such as the boiling-water reactors, by providing the high-temperature steam required for more efficient turbine-generator facilities.

•

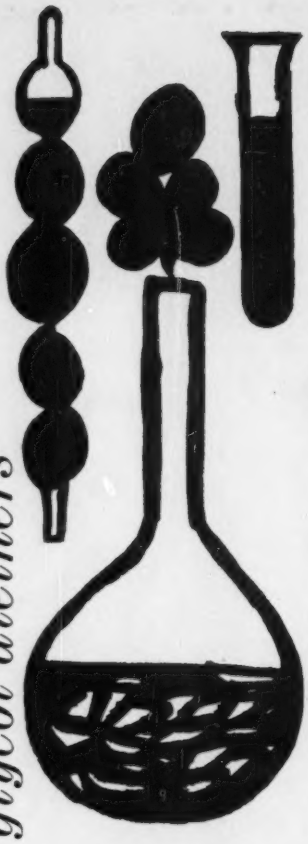
Canadian Refinery: Canadian Oil Companies' (Innisfail, Alta.) new, $4-million refinery will process both natural gas condensate and crude oil. Most other Canadian refineries produce oil products only. By refining easily fractionated gas condensate, the plant obtains high gasoline yields without costly processing equipment. Capacity: 5,000 bbls./day of gas condensate or 2,000 bbls. of crude oil.

Another noteworthy feature of the plant is the cooling system, which uses only 20 gal./minute of water, compared with 30,000 gal./minute at a similar plant. Because it lacks abundant cooling water, the new plant relies on a series of giant air coolers.

•

Cotton Concrete: A new type of concrete in which a hydrolysis product of cotton bolls replaces conventional cement is claimed by the All-Union Scientific Research Institute of Plastics (Moscow, U.S.S.R.). The concrete is said to be stronger than steel and to have compressive, tensile and bending strengths three, five and seven times greater than conventional concrete. In testing adhesion of the new product to metal, reinforcement steel reportedly broke sooner than the metal-concrete surfaces.

glycol diethers



Unique solubility for a variety of organic and inorganic compounds characterizes the ANSUL GLYCOL DIETHERS. These exciting new solvents combine high purity, low active hydrogen content and a wide range of boiling points. ANSUL ETHER 121 is especially effective in the formation of sodium complexes. ANSUL ETHER 141 is an excellent solvent for sodium borohydride . . . ANSUL ETHER 161 as a removal agent for neoprene coatings . . . and ANSUL ETHER 181 as an absorption refrigeration solvent. Despite these specific uses we believe that the potential for the Ansul Glycol Diethers has only been touched. Their physical properties suggest uses as a detergent constituent, a diesel fuel additive, a cellulose derivative solvent. We'll be happy to provide you with test results on a number of inorganic compounds, along with complete specification data, samples and the technical assistance of our people. We invite you to write ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN.*

**E-121 is our trade name for dimethyl ether of ethylene glycol. E-141 is dimethyl ether of diethylene glycol. E-161 is dimethyl ether of triethylene glycol . . . and E-181 is dimethyl ether of tetraethylene glycol.*

ANSUL CHEMICAL COMPANY, MARINETTE, WISCONSIN • INDUSTRIAL CHEMICALS • REFRIGERATION PRODUCTS • FIRE FIGHTING EQUIPMENT

Bzura

WORLD'S SOLE BASIC PRODUCERS OF BOTH

FUMARIC & CITRIC ACID

GUARANTEED SPECIFICATIONS

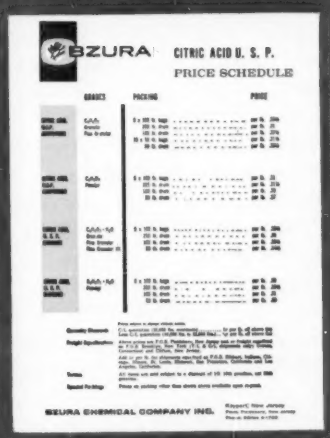
BZURA

HOOC-CH
||
HC-COOH

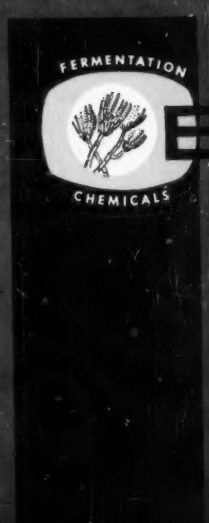
PHYSICAL PROPERTIES

FUMARIC ACID DATA SHEET 602-F

BZURA


BZURA CITRIC ACID U. S. P.
PRICE SCHEDULE

BZURA CHEMICAL COMPANY INC.



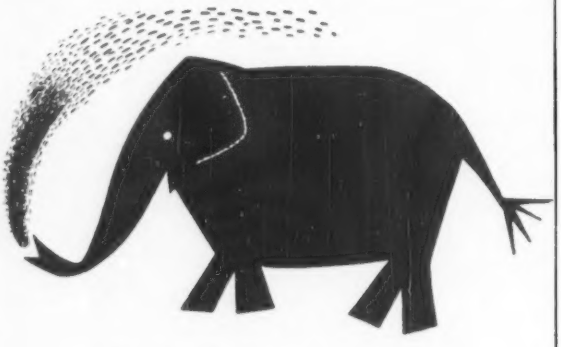
Send for just issued data and prices on Quality Controlled CITRIC and FUMARIC ACIDS from BZURA.

BZURA CHEMICAL COMPANY INC.
Clark Street, off Broadway
Keyport, New Jersey / Fieldsboro, New Jersey

Fast Delivery!

Where you want it!

When you want it!



As much as you want!

That's CSC Ethyl Alcohol!

Here are CSC's 5 Grades of Ethyl Alcohol

ROSSVILLE HEXAGON COLOGNE SPIRITS: Specially refractionated grain spirit. Unsurpassed in purity, clarity and freedom from foreign odor. *The* choice for the finest perfumes, colognes and toilet waters. Available at 190 proof, pure or specially denatured.

ROSSVILLE ALGRAIN®: Highly refined grain alcohol. Free from foreign odor and flavor. Meets the most rigid standard of purity. For use in medicinals, perfumes, toilet waters and flavoring extracts. 190 proof, pure or specially denatured.

ROSSVILLE GOLD SHIELD®: Of uniform high purity. Free from foreign odor and flavor. Widely used for industrial, scientific, pharmaceutical and cosmetic purposes. 190 or 200 proof, pure or specially denatured.

DENATURED: CSC makes available the more than 50 formulas of specially denatured alcohol authorized by the Bureau of Internal Revenue. These are usually prepared from 190 proof ethyl alcohol but anhydrous formulas are also available. All authorized formulas of completely denatured alcohol also available – either anhydrous, 190 or 188 proof.

PROPRIETARY SOLVENTS: Shellacol®, Quakersol®, Fotocol® and Quixol®, CSC's line of alcohol-type solvents. They possess the valuable solvent properties of the completely denatured alcohols and at the same time offer the additional advantage of mild odor and freedom from objectionable characteristics. Individual data sheets for each of these products are available.

INDUSTRIAL CHEMICALS DEPARTMENT

COMMERCIAL SOLVENTS CORPORATION

260 MADISON AVENUE, NEW YORK 16, N. Y.

Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Kansas City
Los Angeles • New Orleans • Newark • New York • St. Louis • San Francisco
IN CANADA: McArthur Chemical Co. (1958) Ltd., Montreal • IN MEXICO: Comsolmex, S. A., Mexico 7, D. F.

Technology
Newsletter

CHEMICAL WEEK
January 7, 1961

A new direct-current power supply is being eyed by chlorine-caustic, aluminum and other electrochemical producers for areas where low-cost hydroelectric power is not available. Called the acyclic generator by developer General Electric, it reportedly generates direct current at about 150,000 amps. and 65 volts.

GE is chary about giving out details, says any information at this time would be "premature." (The first acyclic generator is known to be slated for use in a wind tunnel, which is about ready for startup.) But, one probable advantage of the new generator is that it supplies considerably more kilowatts of power than ordinary dc. generators. The current supplied by dc. generators is typically at lower amperages and higher voltages. And, 8,000 amps. at 700 v. is about as high as they go. This means a large dc. generator would produce about 5,600 kw.; the acyclic generator close to 10,000 kw.

An engineer at one chemical company points out that an acyclic generator, hooked up to a gas turbine, could give utility-purchased power a run for its money. Compared with the cost of rectifiers to convert the purchased power into direct current, the return on investment with in-plant generation using a gas turbine and acyclic generator looks favorable, he says. One slight catch: waste heat from the gas turbine would have to be utilized. But that usually is not hard to do in a chemical plant.

•

An ion-exchange membrane process is now being used to recover salt from sea water in Japan at a plant jointly built by Asahi Glass and Japan Chemical Salt Industry Co. (Sakaide, Japan). Salt production costs are expected to be well below those of conventional solar evaporation techniques. The plant, producing 10,000 tons/year of salt, works by electrolytically ionizing the salt and then separating out the ions with a plastic membrane. However, trouble's brewing: basic world patents for ion-exchange salt recovery are held by Ionics Inc. (Cambridge, Mass.), now claiming infringements by other Japanese firms piloting the process.

•

Water in hydrogen streams can now be accurately measured by a new—and simple—way to use electronic moisture monitors. Prior to this discovery—by Consolidated Electrodynamics Corp. (Pasadena, Calif.)—oxygen generation from electrolysis of the water would combine with the hydrogen to give an erroneous measurement. Research revealed that this "hydrogen effect" is independent of the flow rate of a sample through the electrolytic detector cell. Because water content is dependent on the flow rate, it can now be determined by using the monitor in the conventional way, but by taking readings at several flow rates and then solving simultaneous equations.

•

A record year of $22.9 billion in new contracts for heavy construction has been tabulated by *Engineering News Record*. Volume of contracts awarded in the last half—$11.5 billion—was the biggest ever. In all,

'60 topped '59 by 12%. A CHEMICAL WEEK review of the data shows the process industries won $1.37 billion in contracts for process plants alone, with $782 million placed in the second half. Since most of these contracts will last for at least six months, contractors should feel little pinch in their business this year.

•

A new process for making high-temperature polymers will be used by Borane Chemical Corp. (Montebello, Calif.), a subsidiary of Lasco Industries, Inc. The newly completed 250,000-lbs./month pilot plant (*CW, Dec. 17, '60, p. 25*) will be "the first to utilize a new allyl chloride cracking process," according to Borane President Michael Gilano. The process gives high yields without use of high pressures or "exotic catalysts," is also said to be adjustable to produce polyesters, monomers and prepolymers, and condensation products.

Borane's first chemicals—reportedly capable of withstanding 500 F continuously—include diallyl terephthalate, diallyl pyromellitate, and a number of boron derivatives in monomer form. They are expected to find early applications in electronic circuitry housings in supersonic air and spacecraft, missiles and rockets.

•

Prevention therapy for atherosclerosis in '61? That's the prospect held out by William S. Merrell Co., a division of Richardson-Merrell Inc. Pointing out that cholesterol has been recognized by the American Heart Assn. as a "controllable factor" in this major death cause, Merrell says that its research on MER/29 (*CW, June 11, '60, p. 45*) has made an "important contribution to better understanding of the total problem of cholesterol in artery and heart disease." So Merrell predicts that an answer to "prevention or even reversibility of the atherosclerotic process" is in the offing, and speculates that "a way will be found to block cholesterol buildup in blood vessel walls."

•

A new refractory brick that sets records for strength and durability has been developed by Harbison-Walker Refractories Co. (Pittsburgh). Made of mullite-bonded corundum, it has properties beyond those measurable by standard refractory tests (ASTM C 16-58). It withstands a 25-lbs./sq.in. load at 3000 F for 100 hours with no dimensional change, and exhibits no spalling at that temperature.

The new brick, called the Korundal XD, costs $1.80 each, compared with 75¢ for the basic brick used in open-hearth furnace roofs. However, the Korundal XD is said to have potential in applications that are beyond the limits of the less-expensive bricks. Example: in blast furnace checker-brick stoves, an important reason for the trend toward use of fuel gas and fuel oil in blast furnaces (*CW, April 23, '60, p. 53*). Using a hotter air with this brick, furnace operators can reduce heat loads.

Other services projected for the Korundal XD are vertical lime kilns, vanadium pentoxide furnaces, carbon black furnaces, and electric furnace roofs.

New Hue for Polypropylene

When Hercules Powder Co. recently bought Industrial Rayon Corp.'s polypropylene fiber business (CW, Nov. 26, '60, p. 41), it got more in the bargain than just a plant. A key part of the package was a research team, headed by Gilman Hooper (picture), which is making significant progress in dyeing the tricky fiber.

Goal of this group—as well as that of a flock of other firms, such as polymer and fiber makers, dyestuff producers, textile mills and equipment makers—is to develop a dyeing method that meets the needs of the textile industry without inflating the price of the inherently inexpensive fiber.

Last week Hooper* and group supervisor Max Levine gave CHEMICAL WEEK a report on progress of the company's dye research program, including work already done at Hercules' research center. Vat dyes and soluble vat dyes, they say, both show "great promise." Vat dyes, used as an acid rather than in salt form, have been found to give good lightfastness (up to 80 Fade-Ometer hours) as well as good fastness to washing and drycleaning. Major limitation noted is poor leveling (evenness of color)—unless overcome, this would require stock (fiber) dyeing. There was no report on the dyes' crockfastness (resistance to rubbing off), lack of which has thwarted many hopeful dyes. Among suitable vat dyes reported by Hooper and Levine are Vat Blue 14, Vat Red 29, Vat Green 1, Vat Brown 1 and Vat Yellow 2 (coded according to the Technical Manual of the American Assn. of Textile Chemists and Colorists). Commercial dyes corresponding to these standard designations include such examples as Du Pont's Ponsol Blue GD, General Dyestuff's Helio Fast Scarlet RAV, Geigy's Tinon Brill. Green BF-F, Sandoz' Sandothrene Brown NBR and Ciba's Cibanone Yellow GCB.

Use of vat esters, the "soluble vat" dyes, is reported to improve leveling, but only at the expense of lightfastness. Tabbed as useful are Soluble Vat Blue 5, Soluble Vat Violet 2 and Soluble Vat Yellow 2. Corresponding commercial examples: American Cyanamid's Soluble Vat Blue 2B, National Aniline's Solvat Red Violet RH and Arnold, Hoffman's Ahcovat Soluble Yellow GCN.

Oil-soluble and disperse dyes color polypropylene fiber well but are generally not resistant to solvents. And most fade after 5 to 10 Fade-Ometer exposure hours. Mordant and metallizable acetate dyes are also of interest, according to Hooper and Levine, but the range of satisfactory shades is narrow, especially in the reds. Azoic dyestuffs show promise but will require special methods of application.

The former Industrial Rayon researchers are also considering other approaches of possibly greater interest, but their plans are being kept under wraps.

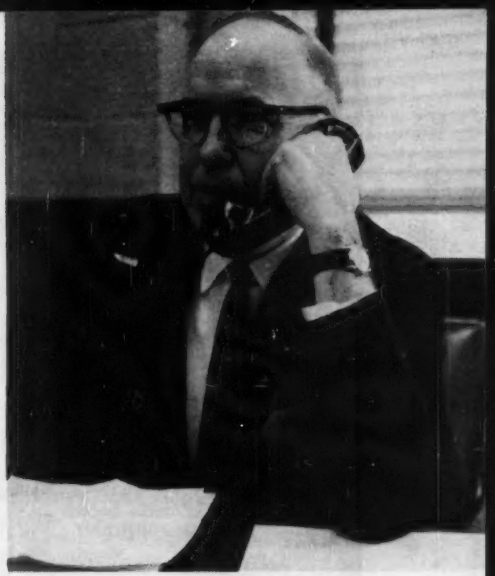
Others Active: Hercules is hardly alone in this field. Research on polypropylene dyes is widespread, although Du Pont says that making headway is so difficult it prefers to see how useful polypropylene will be in the textile field before going all-out on dyeing research. Du Pont pegs oil-soluble and disperse dyes as good bets, but notes that unconventional processing may be necessary.

Fiber maker Reeves Bros., Inc., is also thought to be working on dye modification, using selected dyestuffs of various families, including neutral, premetallized and disperse. Reeves' vice-president for research and development, Victor Erlich, tells CHEMICAL WEEK that the firm can dye commercial polypropylene fiber, but that unconventional processing is necessary. The probable practical solution, says Erlich, will be in the area of making the raw fiber more dyeable, by modifying either polymer or fiber in combination with a specific selection of dyestuffs.

Montecatini Efforts: In an effort to produce brilliant, long-lasting colors in polypropylene fiber, Italy's Montecatini has developed about 60 shades of melt-dyed fiber (coloring added in the molten resin before extrusion). At first glance, this approach would seem to be the answer, especially since it's an inexpensive one. But melt dyeing has two major drawbacks in textile applications: (1) every minor shade variation required by textile designers calls for a production change at the fiber plant, with subsequent inventory problems; (2) textile mill "fly" problems—airborne bits of fiber that contaminate other fibers—would be greatly compounded by colored fibers.

Montecatini has a big stake in improved dyeing methods. It has a 10-million-lbs./year fiber plant (staple and multifilament) in operation, and plans expansion to 20-30 million lbs./year by the end of '61. The firm reports that it has developed some workable methods, especially one involving polymer modification, but only at a noncommercial cost.

Three Australian patent applications that the company says are of "academic interest only" may shed some light on directions in which it is working. One (57,463/60) calls for the addition of polyalkylimines to the molten polymer (*CW Technology Newsletter, Oct. 1, '60*), while another (61,296/60) describes the addition of various types of dicarboxylic acids or their derivatives to the melt. According to the third (59,119/60), phosgene treatment can be used to make the fiber more dyeable, possibly by pitting the surface. (Another Italian firm, Snia Viscosa, describes a similar process, using phosgene and



Hercules' Hooper led polypropylene dyeing studies at Industrial Rayon.

* Hooper, though still working in International Rayon's Cleveland labs, is now director of research and development for Hercules' newly formed Fiber Development Dept., which is headed by Forest Evans. The Hercules purchase also brought to the company a group of about 40 sales, technical service, production and research people, plus all of Industrial Rayon's know-how on polypropylene fiber.

WANT SAFE EFFECTIVE GERMICIDES?

for

WAXES
SOAP
POLISHES
DETERGENTS
COSMETICS
CLEANERS
ANTI-PERSPIRANT
ANTI-ODOR
ANTI-MILDEW
ANTI-DANDRUFF

The very complete series of VANCIDE® germicides has made possible the successful formulation of products unheard of a few short years ago.

There is a VANCIDE available to meet your specific needs, since a wide variety of properties are available. Some are water-soluble — others dissolve in organic solvents. Some are stable on the acid side, others are stable in alkaline systems.

VANCIDE germicides are active against both Gram-positive and Gram-negative bacteria, as well as yeast, fungi and algae.

They are non-toxic, non-irritating, economical and SAFE to use.

Write us your requirements, and we'll advise you which of the following will best meet your needs.

VANCIDE BL	VANCIDE BN
METHYL TUADS	VANCIDE 89RE
VANCIDE 26	VANCIDE 51

Samples available on request.

R. T. VANDERBILT CO.,
SPECIALTIES DEPARTMENT
230 PARK AVENUE
NEW YORK 17, N. Y.

( ) Please send NEW Bulletin 90C.

State Application.....

Name.....

Title.....

(Attach to your Company letterhead) P-22

ultraviolet light, in Australian patent application 58,445/60.)

Choice of Approaches: Although working with existing dyes is the obvious first approach—and undoubtedly the best, if it pays off—the dyeing problem can be attacked in several ways. Irradiation, for instance, is being used in many laboratories, both to cross-link polypropylene and to graft dye-receptive monomers onto the polymer chain.

Radiation Applications, Inc. (Long Island City, N. Y.), is one firm that's studying this method. It says that grafts of 4% methacrylic acid to polypropylene have shown encouraging dyeing properties. RAI is designing a prototype continuous-processing unit that would irradiate 15 million yds. of fabric yearly.

Incorporation of dye-receptive materials in the polymer by copolymerization or in the form of additives is a more likely commercial approach, **however.**

Because the interior of the fiber is less crystalline than the surface—and hence less difficult to color—surface alteration is promising. Physical cracking of the surface is one possibility. Another way is to incorporate a chemical in the melt (e.g., xylene), which boils off during extrusion, leaving a slightly swollen, and more dye-receptive, fiber. Either of these procedures is likely to reduce the fiber's tensile strength, but polypropylene has strength to spare.

Other Problems: Ultraviolet stability of polyproplyene can still be improved, but it's already good enough for practically any use that does not involve constant exposure to sunlight. A key additive called AM 101, developed by Ferro Chemical Co. (Bedford, O.), is used by Hercules to stabilize its polymer, including that used for fiber. Paul Johnstone, assistant general manager of the cellulose products department, calls AM 101 the key ingredient of a stabilizer mixture; but he says that it won't do much when used alone.

Ferro, which expects patents on the material to issue very soon, has sold Hercules worldwide rights for use of the additive in isotactic polyolefins, retaining the polyethylene marketing rights.

Recipes for stabilizing polypropylene to processing heat and oxidation have been pretty well worked out.

The big garment market is target of research by Italy's Montecatini.

Typical additives, as noted in Sun Oil's Australian patent application 56,187/60, are hindered phenols and thio compounds.

Persistent Problem: Even though considerable progress has been made, no one has yet found the full answer to the dyeing problem. There's no big trick to putting color on the fiber; the two biggest roadblocks: doing it economically and assuring that the color will stay on. The practical demands on the textile industry require a successful dyeing process to be applicable to piece goods (fabric) rather than to the unwoven fiber.

Any apparently good dye system can founder on any one of several crucial points: fastness to light, washing, drycleaning, ironing temperatures, crocking, to name the most important. In addition, the dye must level well on the fabric; and a broad range of shades should be obtainable.

Premature introduction of polypropylene fiber is not likely; experience with the older synthetic fibers has taught the chemical industry that textile industry acceptance depends on much more than basic chemical properties. The many aspects of dyeing have to be solved before the big markets open up.

EXPANSION

• K & K Laboratories, Inc. (Jamaica, New York), will make research chemicals and pharmaceuticals in pilot-plant quantities in a new facility at Oceanside, N.Y.

• The Heisler Corp. (Wilmington, Del.) has established a plastic and elastomer compounding and powdered resin development laboratory. Heisler makes high- and low-density polyethylene, Teflon, and polypropylene powders and is now working on powdered nylon.

• Atomics International (Canoga, Park, Calif.), a division of North American Aviation, Inc., has formed a new department for research in thermionic devices, lightweight batteries and fuel cells, and the like. It's called the Energy Conversion Dept., is headed by Ned Rasor.

• Witco Chemical Co. has completed a $250,000 expansion of its Chicago laboratories for urethane resins research and development. Investigations now are largely centered on polyester and polyether resins for urethane foams and solid-cast elastomers.

• Sun Chemical Corp. will establish a corporate research center at Carlstadt, N.J.

• Carter's Ink Co. (Cambridge, Mass.) is embarking on a three-year technical modernization program by setting up four new laboratories for research and development, and also for product evaluation. Activities will include exploratory research in films, paper, textiles, resins and pigments, in addition to product development inks, adhesives, etc.

• Continental Oil Co. has awarded a contract for a $2.2-million expansion of its Ponca City, Okla., research and development facilities to Manhattan Construction Co. (Muskogee, Okla.). Main portion of the expansion will be a 40,000-sq.ft. addition to the main research building, an addition that will approximately double Continental's floor space.

• Electronic Materials Corp. (2200 Colorado Ave., Santa Monica, Calif.) is a newly formed company doing research in the electronic, magnetic, energy conversion, high-temperature and rare-element materials fields. President is R. C. Vickery and vice-president is Hugh Muir, both formerly with Nuclear Corp. of America.

A LEADER IN BIOCHEMICAL RESEARCH

attention:

PRODUCT DEVELOPMENT DIRECTOR √
PURCHASING DIRECTOR √
RESEARCH DIRECTOR √
SALES DIRECTOR √

offers over 60 regular items
to the pharmaceutical...cosmetic...dairy
...and chemical industries...including—

ENZYMES • ANTIOXIDANTS • HORMONES
FINE CHEMICALS • GLANDULARS

plus 20 items for experimental purposes,
such as—ANIMAL BLOOD FRACTIONS,
ORGANIC CHEMICALS, BIOCHEMICALS,
INCLUDING SPECIAL ENZYMES

For more information, contact our technical representatives. Call WElls 2-6771 in Kankakee, Illinois. Or write to:

Bio-Chemical Dept.
ARMOUR PHARMACEUTICAL COMPANY
Kankakee, Illinois

KETONES

Acetone — Methyl Acetone — Methyl Ethyl Ketone
Methyl Isobutyl Ketone — Diacetone — Di-
isobutyl Ketone — Hytrol® O
(Cyclohexanone)

GLYCOLS
GLYCOL ETHERS
CHLORINATED SOLVENTS
KETONES • ESTERS • AMINES
PLASTICIZERS • AROMATIC SOLVENTS
SURFACE ACTIVE AGENTS • ALCOHOLS
ALIPHATIC NAPHTHAS • POLYETHYLENE GLYCOLS

CS CHEMICAL SOLVENTS, INC.
60 PARK PLACE, NEWARK 2, N.J.
WOrth 2-7763 (N.Y.) MArket 2-3650 (N.J.)

WEST END

advance planning **OF ECONOMICAL SODA ASH TRANSPORT ANTICIPATES INDUSTRY'S GROWING NEEDS**

WEST END effects lower freight rates and handling costs for soda ash users in an ever-broadening market by utilizing new Jumbo hopper cars with 60% additional capacity.

Stauffer CHEMICALS

WEST END CHEMICAL COMPANY • DIVISION OF STAUFFER CHEMICAL COMPANY

636 CALIFORNIA STREET, SAN FRANCISCO, CALIFORNIA • PLANT: WESTEND, CALIFORNIA

Urethane Foams Fatten on Apparel Sales

About 2.5 million lbs. of polyurethane foam will be consumed by the clothing industry this year. Principal use: linings for outerwear. It's a growth market. In '65, clothing makers will require an estimated 7 million lbs.

Polyurethane foam is causing a major upheaval in the garment industry. Mainly affected: bulky coats, jackets and outerwear of all kinds whose traditional linings of cotton, wool, etc., are giving way to the lighter and warmer foam interlinings.

Polyurethane, already taking big strides in the furniture, auto upholstery and mattress fields, will be making its first intensified inroads into apparel in '61. Last year, when designers first started to use the material, about 1 million lbs. (approximately 5 million yds.) of foam were consumed by the clothing industry. This year it's estimated the poundage will jump to 2.5 million lbs. and by '65 will climb to 7 million.

Not only is this new-found material a boon to the retail clothing manufacturers—it also means a new market for producers of foam and for suppliers of isocyanates, polyesters, polyether and fluorinated hydrocarbon blowing agents.

Old Material, New Use: In terms of the total market for polyurethane foam—100 million lbs.—the present poundage used by apparel makers is small indeed. And the potential market will probably never be as big an outlet as, say, furniture, because a coat lining is thin. Foam lining for winter clothing is sliced 3/32 in. thick, spring lining 5/64 in. However, the potential of apparel is yet largely untapped. This spring, for the first time, New York's Seventh Avenue will bring out its heavy promotional artillery, ballyhoo the foam.

Such well-known manufacturers as London Fog, McGregor, Phil Rose and dozens of others will be offering flexible foam-lined coats. In the men's field, raincoats, overcoats and jackets will be among the first items offered; for women, raincoats, suits and car coats; for children, snowsuits and sleep wear; and for sportsmen, ski and sailing clothes.

(The children's wear field may be most difficult to penetrate, since mothers tend to be skeptical about the warmth of the light garments until they have worn foam-lined apparel themselves.)

Some potential uses: sleeping bags, shoulder pads, blankets, underwear and socks for hunters, work clothes for people in outdoor jobs.

Many Advantages: Urethane foam, bonded or laminated to any fabric, has excellent drapeability, is dimensionally stable, withstands drycleaning or washing, dries fast, won't stretch or shrink. Most important, it gives warmth without weight. It is claimed that foam linings are 80% warmer than wool, 160% more so than nylon.

An extra advantage for the clothing maker is that the resiliency of the foam helps maintain the garment's shape.

Retail price for items with the new linings is said to be about the same as for conventional clothes.

The urethane foams came late to the apparel field: foams were not tailored for use as linings, and techniques of laminating foam to fabric were not perfected. Most of the foam is flame-bonded to fabrics now, although some adhesives are also used.

Designers find that urethane foam is a versatile material—besides its ability to be bonded to fabric, the foam can be sewn, stitched or cemented to material. In Germany some manufacturers reportedly have woven the foam with wool for use in knitted dresses and mufflers. This process had not been tried in the U.S.

Foam Producers: Scott Paper Co. (Chester, Pa.) and Reeves Brothers, Inc. (New York), are reported to have the biggest share of the apparel foam market. Also big is Nopco Chemical Co. (Newark, N. J.); other producers include General Foam and Paramount.

Scott, reported to have 60% of the apparel foam market, happened into the field while searching for material for a household sponge. Although the company had been working on foam interlinings for four years, it did not begin to market Scott Foam until last year. (In addition to its apparel grade, it also sells an industrial product.)

Scott now has tied up with 16 mills, which laminate the polyester foam to their own fabrics. One of the most successful is Abaco Fabrics, specializing in knits.

Reeves, which had been distributing Curtiss-Wright's Curon foam, recently bought the rights to the name and process. In contrast with Scott, Reeves has a laminating plant of its own and is in the process of building two more facilities. It makes a polyether foam for upholstery as well as a polyester for clothing.

About 20 producers are currently making the foam for the garment industry. Possible future supplier of foam: Dow Chemical Co.

Boost for Isocyanate: Isocyanate producers—Mobay Chemical, Du Pont and Allied Chemical—are showing a sprightly interest in apparel foams, despite the small volume used. All plan to boost their toluene diisocyanate capacity this year (*CW, Nov. 12, '60, p. 113*) and one of the foam makers, Nopco, will build its own isocyanate plant, probably have it onstream in early '62.

Du Pont and Allied have an additional stake in this market—their fluorinated hydrocarbons are used as foaming agents.

Currently, foam designed for apparel linings are polyesters (they flame-bond best), although polyether foams are being tested. Chief advantage of polyether foams: they are less costly.

Although relatively small volumes of isocyanates and resin are used in the making of apparel linings, the foams may be the means of gaining increasing consumer acceptance of urethanes in other applications.

PRODUCTS

Plastisol Stabilizers: Two stabilizers designed for organosols and plastisols under the tradenames Ferro 1776 (for unfilled clear plastisols) and Ferro 1777 (for filled plastisols) are being marketed by Ferro Corp. (4150 East 56th St., Cleveland). Both are light-amber liquids of "A" viscosity.

•

Flexible Magnet: Leyman Corp. (5178 Crookshank Rd., Cincinnati) has developed a permanent magnet material of rubber-bonded barium ferrite which can be readily cut by ordinary tools. It's called Plastiform 1, comes in rings, sheets and strips.

•

High Solids Vinyl: A "high build" vinyl coating, Amercoat No. 99, for application with either conventional or airless spray equipment is being marketed by Amercoat Corp. (South Gate, Calif.). A coating 5 mils thick is possible on a single pass with airless spray equipment, or in two coats using with conventional spray equipment.

•

Thixotropic Agent: Nopco Chemical (Newark, N.J.) has a new thixotropic agent for fluidized-bed formulations. The product is an organophilic silicate and has high thickening ability in both water and organics.

•

Silicone Varnish: A Class H varnish that cures at 150 C in six hours is being sold by Dow Corning Corp. (Midland, Mich.) under the name Dow Corning 981 Varnish. It's said to be especially suited for impregnating transformers of 500 KVA or larger, traction motor armatures, motors and generators.

•

Plating Bath Brightener: Metal & Thermit Corp. (Rahway, N.J.) has developed a new liquid brightener for zinc plating baths. It's tradenamed Zinc Brightener 25, is added directly to plating baths without dilution. It's used at a concentration of 2 qts./100 gal. of solution in barrel plating.

•

Photo Resist: A photo resist, Resist-Etch, said to permit accurate production of lines 0.005 in. wide, spaced 0.005 in. apart, is being marketed by Meaker Co. (Nutley 10, N.J.).

•

Feminine Hygiene Aerosol: Lanpar Co. (2727 West Mockingbird Lane, Dallas) is marketing a vaginal antiseptic in aerosol dispenser under the name Femette. The unit is refillable, comes in a carrying kit. The active ingredients are oxyquiniline sulfate, sodium lauryl sulfate, boric acid, hexachlorophene and glycerol in a bland base.

•

Primer for Organosols: A primer, Armitage P-289 Primer, for use with plastisols, organosols and textured vinyl finishes is being marketed by John L. Armitage Co. (245 Thomas St., Newark, N.J.). The primer may be applied by spray or dip coating and can be air-flashed or baked.

•

Rubber Masterbatch: An intermediate viscosity rubber masterbatch, Pliolflex RMB 224, combines synthetic rubber and a reinforcing resin. It is designed as a general-purpose material by maker Goodyear Tire & Rubber Co., is especially formulated for shoe soling and other light-colored compounds requiring high abrasion resistance.

•

Acrylic Copolymer: Rohm & Haas Co. (Philadelphia) has a new modified copolymer emulsion for floor polish formulations. Rhoplex B-83 produces a high gloss film reported to have good resistance to yellowing and discoloration, soil and heel marks.

•

Red-Violet Pigment: Allied Chemical's National Aniline Division (New York) is marketing a quinacridone pigment — Quindo Magenta RV-6803 —for auto finishes, printing inks, vinyl products, etc. Coatings made with the pigment are reported to have good color retention.

•

Spray Floor Wax: An aerosol floor wax, claimed to be the first, has been introduced in Italy by the Italian affiliate of Geigy Chemical Corp. (Yonkers, N.Y.). Neocera can be used on wood, tile or linoleum flooring and furniture without polishing.

•

Animal Repellent: Pennsalt Chemicals Corp. (Philadelphia) has developed a weather-resistant animal repellent containing thiram. Penco Thiram Animal Repellent protects forest nurseries, fruit trees and ornamental plants against rabbits, meadow mice and deer. A single application lasts at least six months.

EXPANSION

Holland Bound: Charles Weigel Inc., a subsidiary of Chemetron Corp., is moving to Holland, Mich., from its Detroit location. Weigel manufactures varnishes, dryers and dispersed blacks and other specialty products for the printing ink industry. It moves to property adjacent to Holland Color and Chemical Co. (another Chemetron Corp. subsidiary), which produces dry and flushed colors, dispersions, and color intermediates.

•

Goes into Cosmetics: Noxzema Chemical Co. (Baltimore, Md.) has moved into the cosmetic market with introduction of two new products, Cover Girl Pressed Powder and Cover Girl Liquid Makeup, both of which contain Noxzema medication. Nationwide kickoff for the new products will begin this month.

•

On a New Track: A new department called Railroad Adhesives Sales has been established by Armstrong Cork Co. (Lancaster, Pa.). It will promote sale of adhesives developed for cementing rail and for bonding tie plates to wood ties. A. J. Slosser, currently manager of Industrial Adhesives Sales, has been made manager of the new department.

•

Stanley Wins Peggy: Stanley Home Products (Westfield, Conn.) has purchased for cash the assets of Peggy Newton Cosmetic Division of Paul D. Newton & Co. (Newark, N.J.). The company will not be absorbed into Stanley, will be operated under the name of Peggy Newton Inc. and headquartered in Westfield.

•

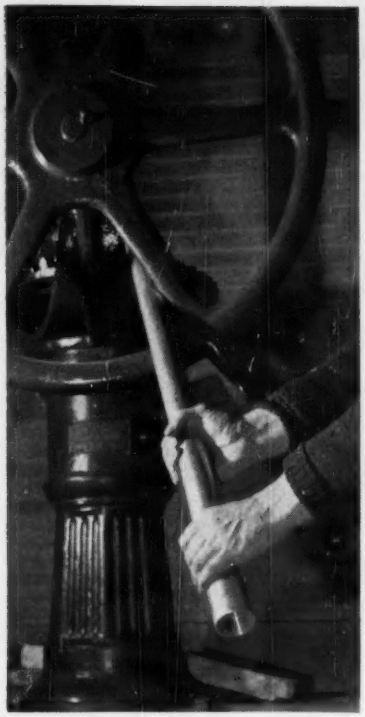
Ups Phthalic Output: Chemische Industrie Uithoorn N.V. is building a new phthalic anhydride plant at Uithoorn near Amsterdam, Holland. The new plant will have an annual capacity of 5,000 tons of phthalic anhydride and will be able to process either naphthalene or orthoxylene to the anhydride. Cost of the plant: about $1.9 million.

•

Moving Day: John Struthers and Co., maker of specialty products and aerosols, has moved its plant, laboratory and offices to 5710 Royalmount Ave., Mount Royal, Montreal, Que., Can.

BRIEFS

A task for Fluorolube®
A better chlorine carrier
About lauryl mercaptan



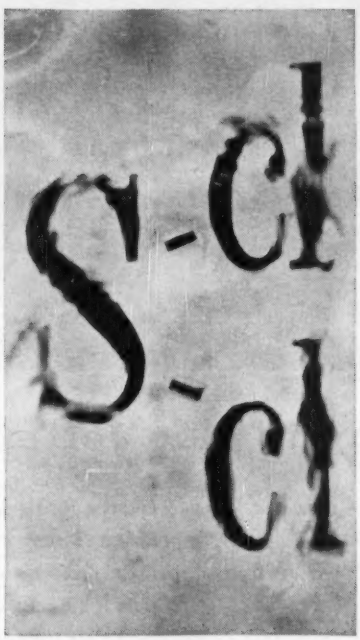
Here, obviously, is a valve that's begging for a shot of lubricant. One that's impervious to oxidants or corrosive liquids. This narrows the field to a very special kind of lubricant: the Fluorolubes (addition polymers of trifluorovinyl chloride).

We use them ourselves on chlorine valves, and find them very good indeed. With old-style lubricants, we had to repack these valves 35 to 50 times a year. With Fluorolube packing, we do it only four or five. Of course the most spectacular uses for Fluorolubes are found in rocketry, where they are applied as coatings and lubricants for parts of missiles in contact with oxygen. They're heat-stable, too. Up to 400° F. We have some literature on Fluorolubes you can get by checking the coupon.

IF YOU WANT REACTIVE CHLORINE ATOMS

A good way to inject chlorine atoms into certain compounds is to use Hooker sulfur dichloride. Examples: chloridizing agent in metallurgy; reagent in manufacture of rubber cements and insecticides; hardener for printing inks.

Since we're in the chlorine business, our background on how to deal with chlorine atoms in usual as well as unusual ways is quite broad. Write us if you have questions—or, if you wish technical information, just check the coupon.



LAURYL MERCAPTAN, A CHEMICAL FOR IDEA MEN

Here is an interesting Hooker product used primarily as a polymerization modifier in the manufacture of "hot type" synthetic rubber. To the imaginative researcher this mercaptan may conjure up some fresh ideas in polymer chemistry. For research samples, please write on your business letterhead. For technical data sheet, check and mail the coupon below.

Typical properties

ANALYSIS:	
mercaptan sulfur	14.7-14.8%
chlorine	0.2%
LAST CRYSTAL POINT	-7°C
BOILING RANGE AT 5 MM (first drop to 95%)	108-139°C
FLASH POINT	128°C
FIRE POINT	139°C
REFRACTIVE INDEX, $n20/D$	1.4582
SPECIFIC GRAVITY AT 15.5°C	0.849

For more information, check here and mail with name, title and company address:

- ☐ Fluorolubes, Data File
- ☐ Sulfur Dichloride, Data Sheet
- ☐ Lauryl Mercaptan, Data Sheet

HOOKER CHEMICAL CORPORATION
701-1 Forty-seventh Street, Niagara Falls, New York

Sales Offices: Buffalo Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

Making pigs healthy is also Jefferson's business

Thousands of progressive hog raisers consider piperazine to be superior to all other anthelmintics as a safe, sure, and economical method of swine worm control. Keeping pigs healthy and producing maximum gains is particularly important to the grower during this year of depressed pork prices. Jefferson, as the leading producer of piperazine, has done much to keep the supply adequate and the price low . . . piperazine costs 75% less than antibiotic-type wormers per hog treated.

Jefferson also produces such piperazine derivatives as N,N'-Dimethylpiperazine, which shows promise as a catalyst for flexible urethane foams; N-Aminoethylpiperazine, a new curing agent for epoxy resins; and Piperazinedipropanol, being tested as a catalyst for rigid urethane foams. In addition, Jefferson supplies complex polyamine mixtures containing piperazine compounds. These mixtures are useful intermediates in the asphalt, resin and petroleum industries. For information on Jefferson's complete line of chemicals and services . . . contact Jefferson Chemical Company, Inc., 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.

HOUSTON • NEW YORK • CHICAGO
CLEVELAND • CHARLOTTE • LOS ANGELES

JEFFERSON CHEMICALS

039

Market Newsletter

CHEMICAL WEEK
January 7, 1961

The industry is starting off the New Year on the same note it sounded during the last few months of '60: one of sagging prices. And indications are that holding the price line will be the most serious problem facing chemical processors this year.

•

Starting things off, trichloroethylene tags were cut late last week by Du Pont. Cuts of 1-1½¢/lb. in previously published prices were made. Reaction from the trade indicates that the new schedule will become industry-wide.

Behind the move: the current import situation (*CW, Dec. 24, '60, p. 73*). Foreign material has been moving into this country well below posted prices. Du Pont's new prices, however, not only meet the current market-place quotes for trichloroethylene, but also are in some cases even lower. This new schedule could put a dent in the volume of foreign material that will be brought into this country in '61. New delivered prices: tank cars, 11¼¢/lb.; tank wagons, 11¾¢/lb.; truckload and carload, 12½¢/lb.; less than truck load, 14¢/lb. in the East, and 14½¢/lb. west of the Rockies.

•

Dow's recently reported price cuts on ethylene glycol antifreeze (in bulk and private label) have not yet been adopted by other producers. The industry's largest manufacturer, Union Carbide, has not changed its prices, was still studying the situation at press time. Dow's tags: tanks, $1.05/gallon; private-label, $1.365 in gallon cans. Prices are f.o.b. shipping point.

•

Glycerin prices have settled down, after two price drops in the past two weeks. First was Shell's cut of 1¾¢/lb. on synthetic material. Soon Procter & Gamble cut off another ¼¢/lb. on natural material. Heavy world inventories, which threatened to flow into the U.S., prompted Shell's move. P&G's cuts were made to establish a wider margin between natural and synthetic. However, both industries have adopted the 2¢/lb. cut.

•

On the foreign scene, prices are also falling. Imperial Chemical Industries has made the following price reductions: methyl methacrylate, down $23.80/long ton; methylene chloride, down $8.40/l.t.; chloroform (technical), down $56/ton; trichloroethylene, down $2.80/l.t.; perchloroethylene, down $14/l.t.; chlorinated rubber, down $28/ton. All cuts go into effect this week, apply to U.K. customers only.

•

Construction of the first privately financed helium extraction unit to be built in the U.S. is about to get under way in the Pinta Field,

Apache County, Arizona. Kerr-McGee Oil Industries, Inc., will build the plant, which is designed to process 2.5 million cu.ft./day of gas. K-M estimates recoverable reserves of pure helium at about 0.6 billion cu. ft. Air Products, Inc., is designing and engineering the unit, will provide all necessary low-temperature equipment.

•

More toluene and benzene are on the way—from DX Sunray's petrochemical operations at Tulsa, Okla. With the recent completion of its new Udex unit, the company will be able to turn out 9 million gal./year of benzene and 5 million gal./year of toluene. Almost all the toluene will be used captively in Sunray's proposed Hydeal plant, which is now under construction at the Tulsa refinery.

•

U.S. consumption of sulfur hit another record in '60, for the second consecutive year, according to Charles A. Wight, president of Freeport Sulphur Co. According to his preliminary estimates, domestic consumption of sulfur in all forms was somewhat in excess of the 5.95 million long tons used in '59. One factor playing a strong role in the gain: the phosphate fertilizer industry—an important outlet for sulfur—which also turned in a record year.

Total sulfur production was also up, about 7%—as output from all sources is estimated at 6.6 million tons. This is 435,000 tons more than was produced in '59.

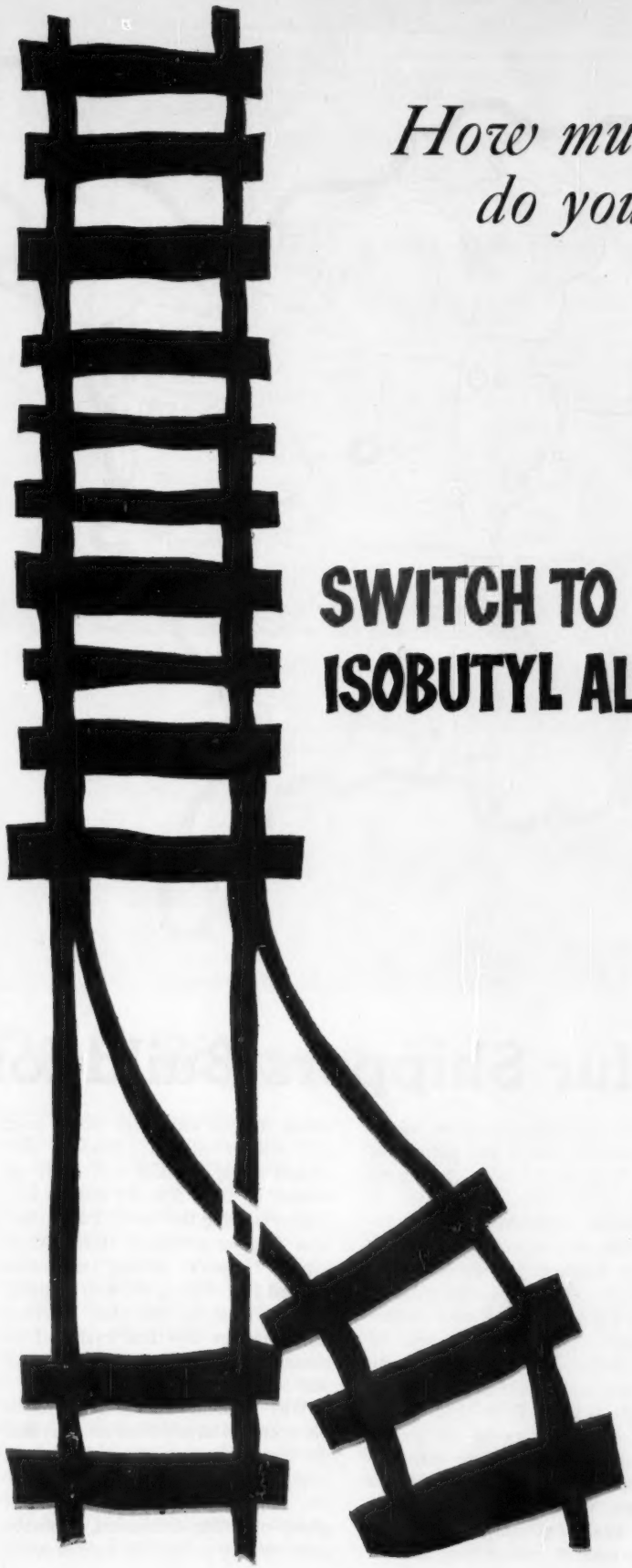
Breaking down production by various sources, Wight estimates that 4.95 million tons of elemental sulfur were mined by the French hot-water process (from salt domes deposits along the coast of Louisiana and Texas); 725,000 tons were recovered from sour natural gas and refinery gases; 425,000 tons were contained in pyrites; and 500,000 tons came from various other sources.

The high level of business activity in many non-Communist nations proved a boon for the export of sulfur from the U.S. Shipments outside the U.S. are estimated at a record high of 1.7 million tons in '60—an increase of almost 6%, 100,000 tons over '59. Wight points out that the new record was achieved despite an additional 600,000 tons supplied by other producers operating in world markets.

•

A warning of potential shortages of nine space-age metals in the years ahead has been sounded by the joint Congressional Committee on Defense Production. The metals specified are tantalum, columbium, molybdenum, bismuth, titanium, tellurium, platinum, palladium and hafnium.

Current demand for these metals in missile and space-age vehicles applications is primarily for experimental purposes, the committee noted. However, significantly larger amounts are likely to be needed in the near future, as applications are refined.



How much butyl alcohol do you use in a year?

The cost of many products and processes using butyl alcohol can be cut significantly through use of lower-priced Isobutyl Alcohol.

Obviously, the savings you obtain depends on your particular product or operation, but just to give you an idea of what can be done, look at the table below and estimate for yourself the cost reduction your company can realize in a single year by switching to Isobutyl Alcohol.

Eastman Isobutyl Alcohol costs 2½¢/pound less than the butyl derivative. This works out to a saving of $1,750 on a typical 10,000 gallon tank car. You take it from there.

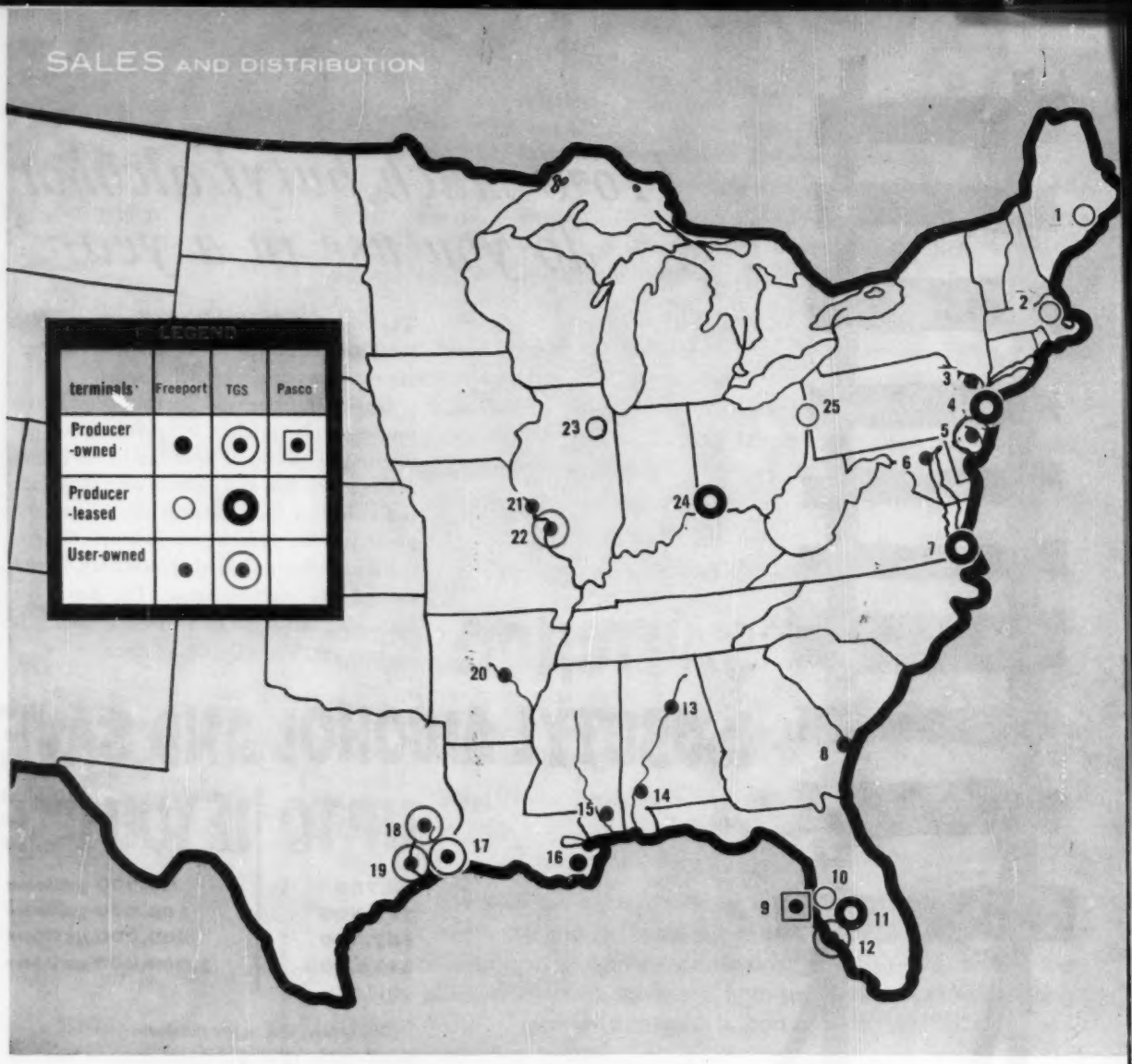
SWITCH TO ISOBUTYL ALCOHOL AND SAVE

UP TO	IF YOU USE
$8,750	50,000 gallons
$17,500	100,000 gallons
$87,500	500,000 gallons
$175,000	1,000,000 gallons

Naturally, one of the questions you will want answered is: How will replacement of butyl alcohol with Isobutyl Alcohol affect your process or product? For general information bearing on the question, refer to our new booklet "Isobutyl Alcohol." It describes physical properties and performance characteristics of this economical solvent and reaction intermediate. For specific answers get in touch with the Eastman representative nearest you or write to our Customer Service Laboratory.

Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
subsidiary of Eastman Kodak Company

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Massachusetts; Greensboro, N. C.; Houston; New York; Philadelphia; St. Louis. **West Coast: Wilson & Geo. Meyer & Company,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.



Molten Sulfur Shippers Build for

Prospects for doubled molten sulfur shipments in '61 reflect redoubled determination of Frasch-process producers to counter inroads made by producers of "sour gas" sulfur. Right now, major suppliers are building or leasing new heated tanks for storing a total of over 200,000 tons of molten sulfur. In addition, they are readying three new tankers for service this year —together they can move around 45,000 tons at one time.

A key point in the construction of the new facilities is their nearness to major customers; the sulfur producers are stressing not only the pluses of the liquid product but also two other major advantages: low freight costs and speedy delivery (a user can keep his inventories low). Hoped-for result: almost half of the sulfur sold in the U.S. in '61 will be shipped molten.

Plenty of Optimism: Biggest investor this year in molten facilities is Freeport Sulphur; its recent expansions (*CW Market Newsletter, Dec. 24, '60*) will ultimately allow it to handle some 1.5 million tons/year of molten sulfur. This is over half the company's current annual sales. Freeport expects up to 70% of all its domestic shipments to be in molten form within three to four years.

Its optimism is reflected by views of others. Texas Gulf Sulphur, looking at total U.S. consumption, sees a jump from 1 million long tons of sulfur shipped molten in '60 to over 2.2 million in '61. Over-all elemental sulfur demand will likely be slower: up from 5 to 5.1 million l.t.

Emphasizing this trend, Pan American Sulphur President Harry Webb reports Pasco's molten shipments jumped 17% during '60, with a similar increase expected this year. Jefferson Lake Sulphur says that over half its domestic shipments are molten, and will be up about 10% in '61.

Why Molten? This steady growth has occurred largely because users find the liquid material advantageous, can swing over to it with little or no trouble. Sulfuric acid producers, largest group of sulfur consumers, probably gain most by getting the molten prod-

Molten Sulfur Terminals

	Location	Current Status
1.	Bucksport, Me.	To be leased by Freeport Sulphur Co.; now being planned.
2.	Everett, Mass.	To be leased by Freeport; now under construction.
3.	Arthur Kill, N.J.	Owned by a Freeport customer.
4.	Carteret, N.J.	To be leased by Texas Gulf Sulphur Co.; opens this month.
5.	Sayreville, N.J.	Owned by a TGS customer.
6.	Baltimore, Md.	Owned by a Freeport customer.
7.	Norfolk, Va.	Leased by TGS; opens this month.
8.	Savannah, Ga.	Owned by a Freeport customer.
9.	Tampa, Fla.	Pan American Sulphur Co.'s main U.S. shipping point and remelting facility.
10.	Tampa, Fla.	To be leased by Freeport; now under construction.
11.	Tampa, Fla.	Leased by TGS.
12.	Tampa, Fla.	Owned by a TGS customer.
13.	Alabama	Owned by a Freeport customer.
14.	Alabama	Owned by a Freeport customer.
15.	Mississippi	Owned by a Freeport customer.
16.	Port Sulphur, La.	Freeport's main shipping facility; molten capacity: 1.5 million tons/year.
17.	Beaumont, Tex.	Texas Gulf's principal shipping point.
18.	Houston, Tex.	Owned by a TGS customer.
19.	Houston, Tex.	Owned by a TGS customer.
20.	Arkansas	Owned by a Freeport customer.
21.	Missouri	Owned by a Freeport customer.
22.	St. Louis, Mo.	Owned by a TGS customer.
23.	Joliet, Ill.	To be leased by Freeport; now under construction.
24.	Cincinnati, O.	Leased by TGS; was the first leased terminal in U.S.; opened in '59.
25.	Wellsville, O.	To be leased by Freeport; now being planned.

Molten Sulfur Transportation Equipment

	No. in U.S.	Handling Capacity	Comments
Ocean tank ships	5	De Bardeleben (7,500 tons)	Converted Liberty ship
		S.S. Chemical Transporter (16,000 tons over-all; 2,500 tons molten sulfur)	Converted T-2 tanker. Molten sulfur only one of several chemical cargoes.
		S.S. Marine Sulphur Queen (14-16,000 tons)	Converted T-2 tanker, to be used by TGS
		S.S. Louisiana Sulphur (14-16,000 tons)	Converted T-2 tanker, to be used by Freeport
		Unnamed tanker (14-16,000 tons)	Converted T-2 tanker, to be used by Pan American
Barges	15-20	About 1,000-3,000 tons	Resemble insulated vacuum bottles
Rail tank cars	800-900	About 10,000 gal. — some 64 tons of sulfur	Lessors may add to their fleets during '61
Tank trucks	75-100	Up to 20 tons of sulfur	Useful for rapid delivery near terminals. Probably more to go into service in '61.

Their Biggest Year

uct. Primary plus: simplified handling —it's easy to hook up the tank car or barge to either storage tank or acid production pit. This reduced labor cost helps offset the high cost of insulated tank cars.

Second, remelting is no problem—with steam lines in the rail cars—if the sulfur solidifies. And there are other advantages: wind loss, which could be as much as 1-2%, is minimized, as are contamination and corrosion of nearby equipment and the danger of dust explosions. Moreover, the molten material is clean—filter-clogging is reduced and repair and downtime costs are lowered.

Getting and storing molten sulfur isn't cheap, however. One producer estimates storage construction costs at $20-25/ton capacity. He cites an estimated $500,000 for one 20,000-tons terminal under construction, $600,000 for one of 26,000-tons capacity. The only cost for storage of solid sulfur, on the other hand, is for dumping space and handling equipment.

New Terminals: Independent marine transporters are investing some $20 million in Freeport's new vessels and terminals. Freeport itself is putting $3-4 million into additional facilities. First, capacity of its Port Sulphur, La., shipping center is being increased from 24,000 to 60,000 tons.

The independent companies will build terminals used by Freeport, at Joliet, Ill., and Wellsville, O. Their capacity: 10-20,000 tons. Already sulfuric acid producers in these areas report plans to shift to molten when the terminals are finished. Freeport's newest coastal transhipment centers: 30,000-tons storage at Tampa, Fla., 10,000 tons at Everett, Mass., and 20,000 tons at Bucksport, Me.

Texas Gulf is adding 9,000-tons capacity to its Cincinnati terminal. Its 26,000-tons terminal at Carteret, N.J., will supply users in the New York area. Down the coast, its 20,000-tons terminal at Norfolk, Va., is being built by an independent transporter.

Pan American Sulphur is setting up its first molten storage tank in Tampa, Fla. The 20,000-tons tank, to be completed in February, will receive molten sulfur from Mexico in Pan American's tanker now under conversion in Germany. The tanker will enter service in May, not far behind those of Texas Gulf and Freeport.*

These tankers hold 14-16,000 long tons of sulfur, could carry as much as 400,000 l.t./year. The Pan American tanker will run from Mexico to Tampa and the East Coast. The others will supply East Coast customers from Texas and Louisiana centers.

Customers' Facilities: Texas Gulf and Freeport estimate that their customers own or operate over 75,000 tons of molten sulfur storage capacity (*see map*). National Lead, for example, is setting up equipment at Sayreville, N.J., to store molten sulfur that will come in by barge from TGS's Carteret terminal. American Cyanamid is also building receiving tanks at Savannah to handle some 60,000 tons/year. USI Chemicals plans to complete its new storage facilities at Tuscola, Ill., later this month.

So far, major activity in new molten sulfur terminals has been limited to Eastern seaboard and Gulf Coast ports, and along major East and Midwest rivers. Before the gas-sulfur suppliers took over the West Coast markets, there was a chance that liquid terminals might appear there. Now that possibility is practically gone.

But Frasch producers aren't wasting tears over this lost Western market; they're taking all the steps they can to make sure they lose no more—and the molten terminals are among their most promising measures.

* TGS's vessel is the *S.S. Marine Sulphur Queen;* Freeport's the *S.S. Louisiana Sulphur.* Both are to be launched this month.

In the '50s the chemical industries moved to raw materials of the South and Southwest. Now, say some industrial development experts, the trend is shifting: more plants are being built near markets.

Regional Growth Pattern Shifts

Growth patterns of regional chemical process industries are shifting. Whereas raw materials seemed to be a dominating factor in locating a plant in the past decade, greater emphasis in the next 10 years may be placed on maturing geographical markets.

The charts (*right*) reveal five regions currently marking CPI growth—Pacific, West North Central, Middle Atlantic, South Atlantic, East North Central—as indicated by a comparison of state and regional preferences shown in '60's reports of new construction and expansions. Three regions—Mountain, East South Central, New England—show declining curves, while one, West South Central, appears to be stabilizing.

Regions Report: While marketing factors seem to be taking on added importance—consistent with new marketing philosophies developing in many chemical companies—talks with industrial development people in the various regions bring out a variety of reasons for the shift in growth patterns.

For example, in the Pacific area—where California has shown the greatest upward growth in CPI employment and construction—industrial development observers report a rash of site buying.

Says one man, "Companies that have come out to the West Coast, and grown, have found they haven't enough land to grow on." Many, he reports, are buying without specific plans for the site.

A common comment in California is that the future of the chemical process industries lies where the materials are consumed rather than where the raw materials are. This means that the big rush to the Southwest may soon undergo an appreciable slackening as companies build plants in the coastal states to serve exploding markets there.

This shift seems to be borne out by reports from the West South Central States—long led by Texas and Louisiana in employment and construction—where there's a tapering off of major plant construction. One plant manager sums it up this way: "CPI growth down here can be termed spotty, meaning there are a few hot spots of new plants and sizable plant expansions but this isn't a general thing by any means. Normal capacity increases and new facilities are being built onto existing plants, but the big money is being spent in only a few places."

The Southwest has long been known as a region of raw-material riches. Now, reports another manager, marketing experts are "watching the growing population here and wondering why they must ship basic chemicals back East for conversion into consumer goods or final reaction into other products, which then have to be shipped back here for sale to our growing consumer market."

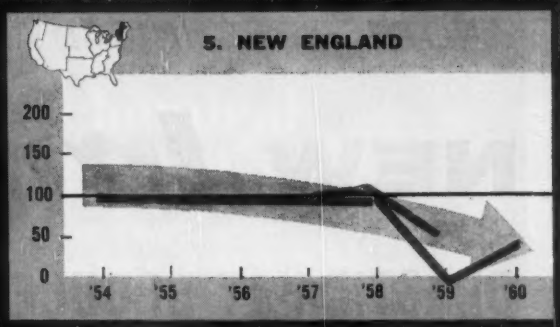
North Central: The two North Central regions, East and West, show upward shifts in process activity. Both regions have process and transportation water, a prime reason for their popularity, and also are well situated for access to major markets in both the East and the South. Generally speaking, and with a few important exceptions, neither of the North Central regions is blessed with abundant natural raw chemical materials. Exceptions: the brine wells of Michigan, timber for paper in Wisconsin and Minnesota, cement in Iowa. Regional development experts expect a real boom in the East North Central with a modest expansion in investment and jobs in the West North Central states. Look for greatest activity in Ohio and Illinois, two states that are already setting the pace.

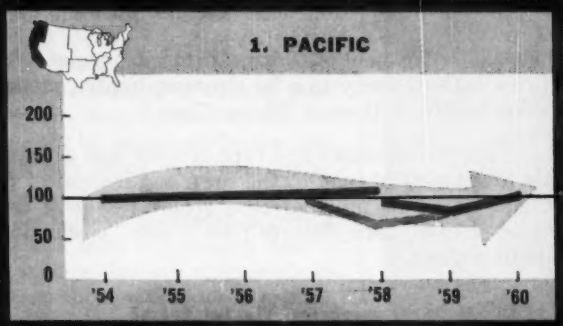
Two other areas currently on the rise are the South Atlantic and Middle Atlantic. In the South Atlantic, the chemical processors are building in the market areas, primarily to serve textile industry demands for synthetic fibers, dyestuffs, sizing agents, and the like. Raw-material sources don't play a large part in drawing industry, except in the pulp and paper field.

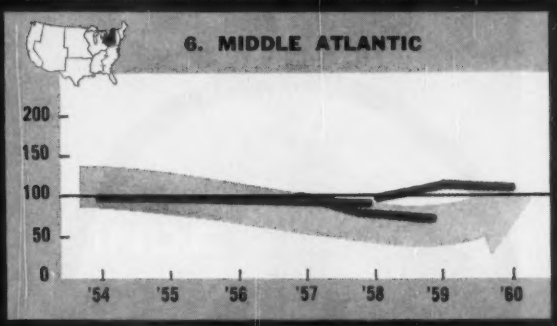
In the Middle Atlantic area New York is pulling the other two states—New Jersey and Pennsylvania — upward in construction and expansion, much of it expansion of existing facilities and connected with low power rates and water transportation available along the Niagara frontier. At the same time, many chemical processors are expanding plants in New Jersey along the oil and chemical complex from New York City to Philadelphia.

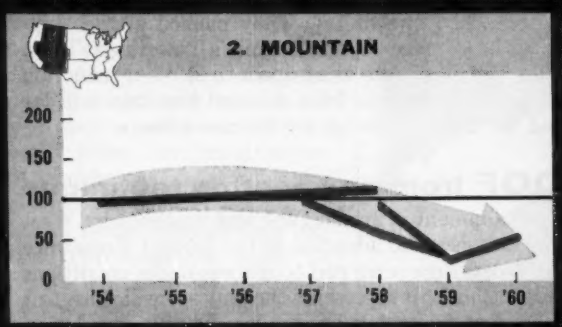
Downward Trends: Other regions appear to be softening in their attractiveness to process industries. Two of them, New England and the Mountain states, report, however, that while construction of new operating facilities may be waning, their regions are

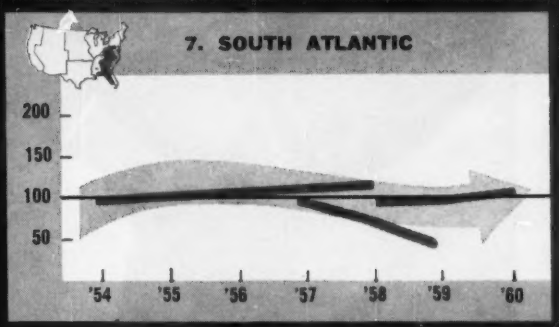
LEGEND FOR CHARTS
1 Washington, Oregon, California
2 Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada
3 Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas
4 Arkansas, Louisiana, Oklahoma, Texas
5 Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut
6 New York, New Jersey, Pennsylvania
7 Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida
8 Ohio, Indiana, Illinois, Michigan, Wisconsin
9 Kentucky, Tennessee, Alabama, Mississippi
CPI Employment*
CPI Construction*
CW Construction Estimate*

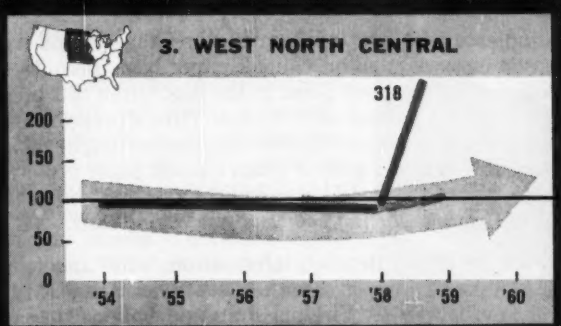


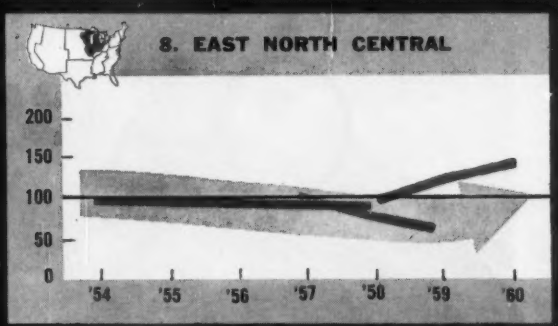


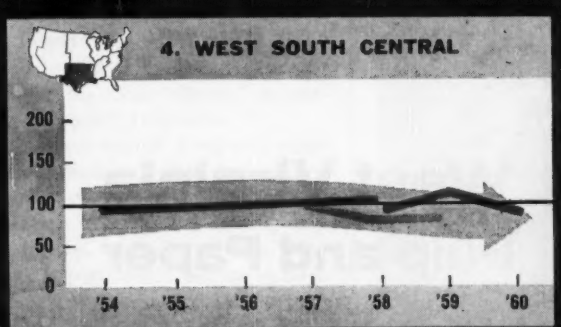


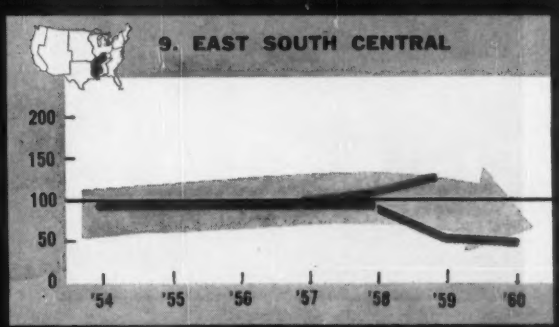










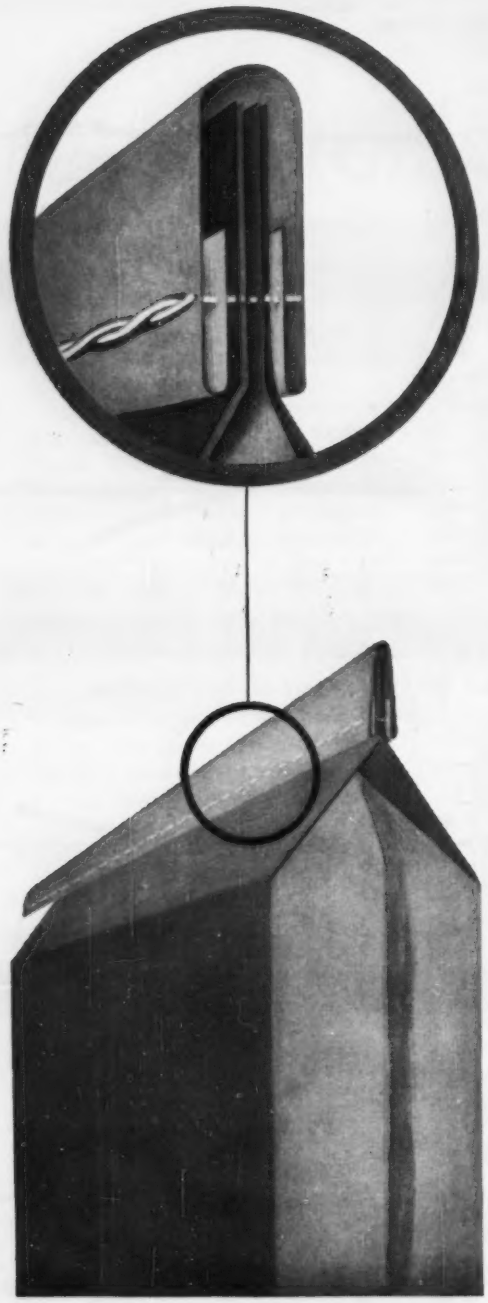


*Sources: '58 U.S. Census of Manufactures, MCA Construction Surveys, Chemical Week Expansion Notes.

ANOTHER TECHNICAL ADVANCE FROM WEST VIRGINIA

NEW ImpacTAPE™

DRASTICALLY REDUCES SEWN-END BAG FAILURE



Pioneer in the development of Clupak* extensible paper, West Virginia now leads the way to a far stronger, tighter, money-saving sewn multiwall through "ImpacTape."

ImpacTape is a revolutionary new type of sewn tape closure** that adds four layers of tape to the sewn end instead of the conventional two. This provides *49% greater toughness* than standard sewn 70-lb. tape closures plus a new "cushioning" against impact shock.

PROOF from actual field trial

A leading cement company had an unusually high sewn valve breakage rate of 1%. They packed a trial shipment of bags, using West Virginia's new ImpacTape. Average breakage rate went down to .3%—a reduction of 70%. Dollar savings from reduced breakage will far exceed the small upcharge for the new closure.

PROOF from new testing technique

The development of ImpacTape was hastened by West Virginia's successful adoption of the Impact Resistance Tester to measure sewn end toughness under conditions of sudden shock. It represents the only sewn closure test devised thus far which bears a predictable correlation to drop tests and actual field performance.

Studies indicate that 70% of sewn bag breakage ordinarily is at the sewn closure, even on Clupak paper bags, because the sewn closure is the weakest point in the bag. Often this breakage was incorrectly blamed on the paper. Now stronger ImpacTape opens the door to profits from the greater toughness and possible basis weight reductions which Clupak paper is delivering to thousands of users. *This is realistic research achievement —aimed straight at reducing your total packaging costs.*

For a brochure giving detailed information, write and tell us whether you use sewn open mouth or sewn valve bags. Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, N. Y.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.*

***Patent Pending.*

West Virginia Pulp and Paper

becoming more attractive as sites for research facilities. In the East South Central region the downturn in construction and expansion is diagnosed as only temporary — there are too many industrial attractions, such as inexpensive power, for industry to hold back for very long.

Location Factors: Industrial location shifts stem from a number of important factors. The Fantus Co., largest and most active of plant site-locating specialists, names six factors that it says have played an important role in the situating of chemical process plants over the past decade and that will be important in the '60s:

(1) *Population and market shifts.* The outstanding marketing factor will be the dynamic metropolitan growth. This will spark a population drift to the suburbs that will ultimately concentrate about 60% of the U.S. population in about 20 interurbias.

(2) *Transportation costs.* Spiraling increases in distribution costs are tightening competition in localized markets. Many small, subregional producers, despite their lack of volume production, still can offer lower delivered prices and better service. What stands out is that general freight increases in the past decade, applied as percentages, have not only inflated rates across the board but also have increased the differential between competitive producing points.

(3) *Labor situation.* There is a tendency in the process industries to brush off labor costs as not a significant factor in selecting a plant site. While labor costs in large-volume industries are not always important unit-cost factors, in many branches of the CPI they take on considerable weight. More than that, regional and intraregional wage differences can be significant, as may also female wage differentials. Therefore, for large segments of the chemical process industries, location planning will continue to place emphasis on communities that offer a favorable wage pattern and lowest total employment costs. Added to this is a natural desire to go where the labor "climate" is amenable to smooth operations.

(4) *Water supply.* Declining water levels in wells and the deteriorating capability of municipal water systems to service industry are limiting factors in the selection of sites. The former is particularly serious in large

chemical processors!

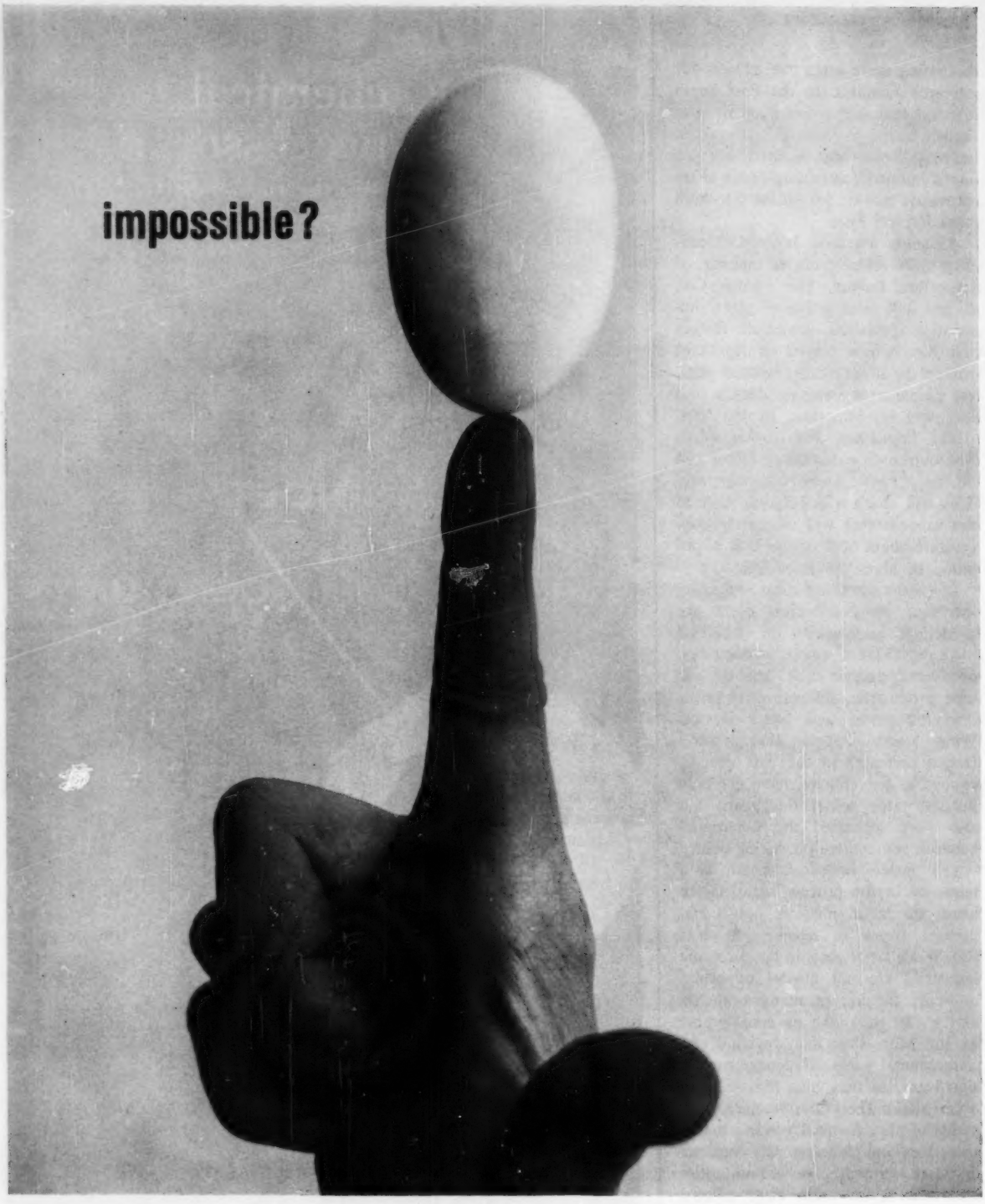
An over-the-fence oxygen plant will deliver nitrogen as well with

LINDE CERTAINTY

CERTAINTY that, with LINDE design, the one need not be at the expense of the other. CERTAINTY that the same standards of purity and volume can be maintained consistently. CERTAINTY that the latest advances in automated control will guarantee maximum efficiency throughout the process.

LINDE COMPANY
DIVISION OF UNION CARBIDE CORPORATION

UNION CARBIDE



Impossible . . . no. Difficult . . . yes. Any problem looks that way before it's solved. That's where the challenge lies . . . and that's where Kay-Fries can help with a classical series of low molecular weight aliphatic polyfunctional molecules.* Technical literature, samples and advice are yours for the asking.

KAY-FRIES CHEMICALS, INC., 180 MADISON AVE., NEW YORK 16, N. Y.

*Barbituric Acid • Cyanoacetic Acid • Cyanoacetamide • Methyl and Ethyl Cyanoacetate • Malonic Acid • Diethyl Malonate Dichloroacetic Acid • Methyl Dichloroacetate • Malonaldehyde Diacetal • Malononitrile • Methyl Chloroacetate • Methyl and Ethyl Orthoformate • o-Hydroxyacetophenone • Ethyl Lactate • Ethyl Chloroacetate • Diethyl Ethoxymethylene Malonate • Sodium Formaldehyde Bisulfite.

areas of the North Central states, the Pacific Southwest and on the Gulf Coast. The municipal water situation is a nationwide problem.

(5) *Stream pollution.* Although there's greater awareness of pollution problems, many states lag in developing clear-cut systems of stream classification. Regulations in some states are well defined, while in others they are so general and unclear they hamper site selection.

(6) *Zoning.* Zoning of industrial sites, a thorny problem over the past decade, promises to be a battleground in the '60s. Modern zoning codes are developing a string of performance standards that industry will have to meet. They are based on noise, smoke, odor, dust and dirt, noxious gases, glare and heat, fire and safety hazard, industrial sewage wastes, traffic and transportation, aesthetics and psychological effects.

Outlook: Growing interest in regional marketing will put new emphasis on marketing factors connected with plant site selection. Regions and states with growing population centers, active market-oriented industrial promotion programs will see new process industries growth. Overriding concerns to management will be the need to meet stringent zoning ordinances and to seek clarification of pollution laws and regulations. Look for process plants to continue mushrooming on the West Coast and for accelerated growth along the great watersheds of the Central states.

LABOR

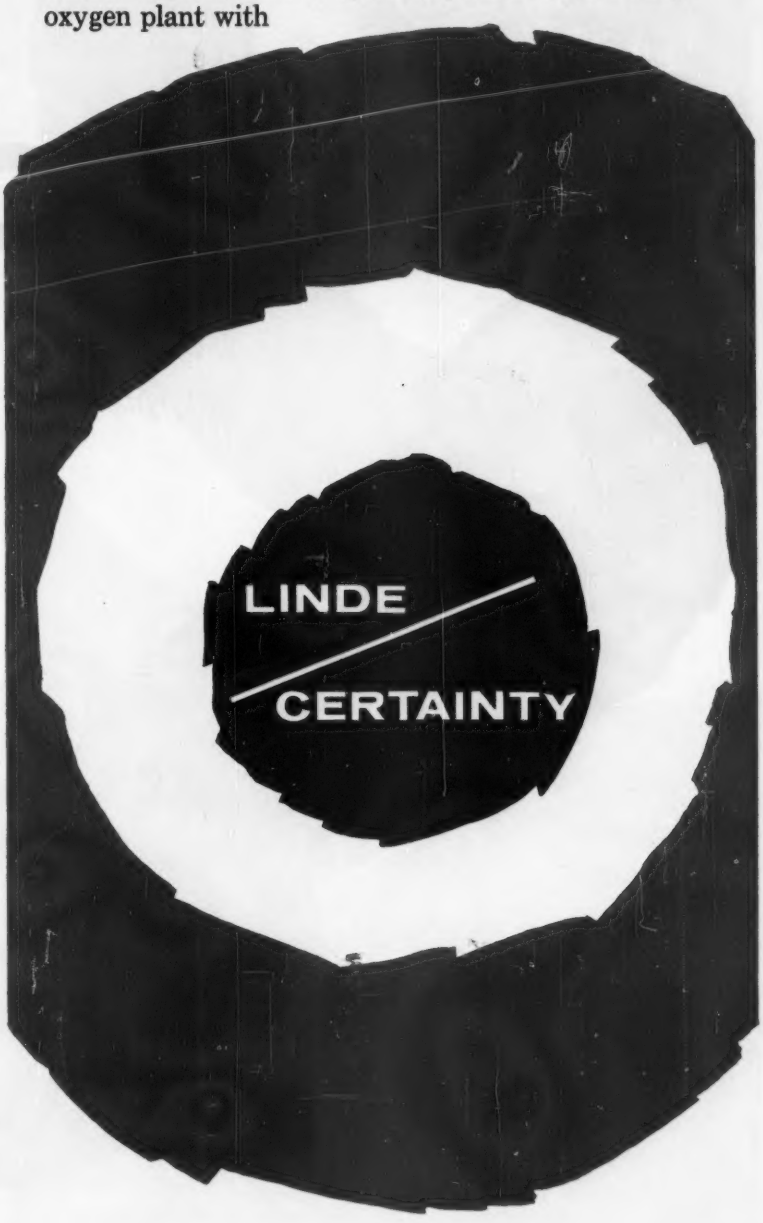
Oak Ridge Settlement: An eight-day walkout of some 1,500 construction employees at atomic energy building projects at Oak Ridge, Tenn., ended after settlement of a dispute over claims by the Electrical Workers Union, Local 270, that a subcontractor was using nonunion labor. Terms of the settlement were not revealed.

•

Monsanto Pact: Monsanto Chemical Co. and five unions have reached agreement on increased pension and group insurance benefits covering more than 9,500 hourly employees in 15 plants. Maximum monthly pension was hiked from $2.25 to $2.85 for each year of service. Under the agreement an average employee with 25 years of service would, on re-

chemical processors!

Full automatic control operates your over-the-fence oxygen plant with



CERTAINTY that your oxygen will be delivered via the most advanced techniques of automation available today. CERTAINTY that LINDE's resources in facilities and personnel will provide maximum efficiency of design to fit your needs. CERTAINTY that LINDE's financial arrangements need not involve your capital.

LINDE COMPANY
DIVISION OF UNION CARBIDE CORPORATION

UNION CARBIDE

NOPCO®

gives leather suppleness

By using Nopco's wide variety of chemical specialties, tanners produce *all* the characteristics—every type of leather for today's diverse requirements. Tanning and almost every other industry depend at one time or another on Nopco's fine chemicals, industrial chemicals, or plastics.

For complete information see Chemical Materials Catalog, pages 212-213.

A skilled hand in chemistry . . . at work for you

Lubricants
Detergents
Plasticizers
Softeners
Emulsifiers
Dispersants
Wetting Agents
Defoamers
Stabilizers
Metallic Soaps
Enzymes
Thickeners
Vitamins
Foamed Plastics

NOPCO®

NOPCO CHEMICAL COMPANY

60 Park Place, Newark N.J.

Harrison, N.J. • Richmond, Calif.
Cedartown, Ga. • Boston, Mass.
Chicago, Ill. • London, Canada

tirement, receive $186.75/month, including Social Security benefits. Early retirement and total and permanent disability pension provisions were improved, as were group hospitalization and insurance benefits. Unions involved are International Chemical Workers; Oil Chemical & Atomic Workers; Operating Engineers; Electrical Workers; and Machinists.

KEY CHANGES

Harold C. Erskine to executive vice-president; **Edward B. Wilder** to vice-president, finance; **John D. Harper** to vice-president, smelting and fabricating; **George W. Streepey** to vice-president, raw-materials and refining divisions; **Matt W. Stanley** to treasurer; Aluminum Co. of America (Pittsburgh, Pa.).

S. J. Spitz, Jr., to president, and **Harold E. Rose** to executive vice-president, Newport Industries Division, Heyden Newport Chemical Corp.

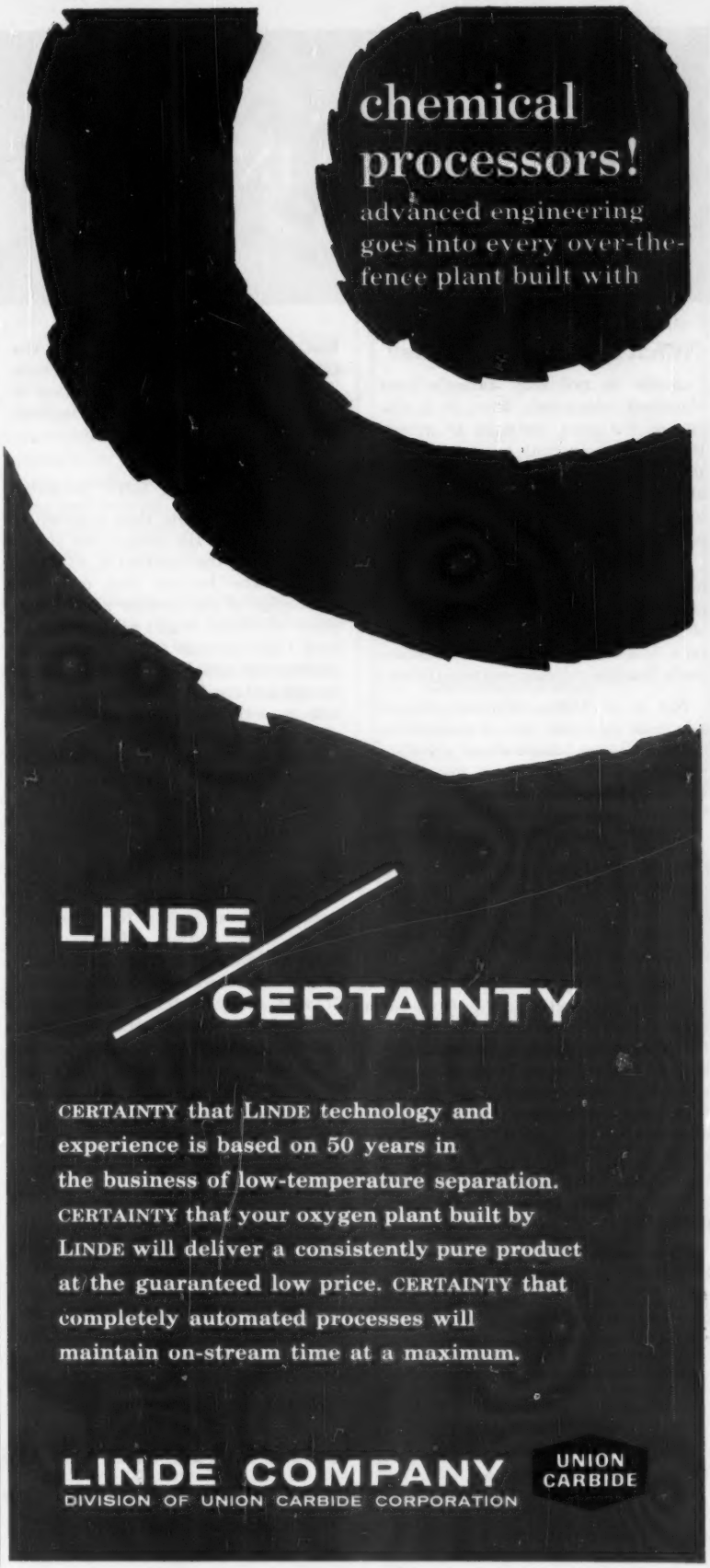
Arthur W. Steudel to chairman of the board and chief executive officer, and **E. Colin Baldwin** to president, Sherwin-Williams Co. (Cleveland).

Elwood W. Phares to vice-president, sales, Cary Chemical Inc. (East Brunswick, N.J.).

Claude O. Stephens to chief executive officer, Texas Gulf Sulphur Co. (Houston).

Ben C. Carter to executive vice-president, finance; **Jack M. Pope** to executive vice-president, administration; **Hubert L. Byrd** to executive vice-president, machinery divisions; **William N. Williams** to senior vice-president; Food Machinery and Chemical Corp. (San Jose, Calif.).

Lambert D. Johnson, Jr., Dr. W. D. Snively, Jr., to executive vice-presidents, and **Dr. Louis F. Rittelmeyer, Jr.,** to vice-president, medical director, Mead Johnson & Co.; **Albert R. Waynes** to president, Mead Johnson International; **John T. McLoughlin** to president Mead Johnson Laboratories; **Robert E. Sessions** to president, **C. Joseph Genster** to vice-president, marketing, **Orville P. Nuffer** to vice-president, Pablum-BiB and new products, Edward Dalton Co.; all divisions of Mead Johnson & Co. (Evansville, Ind.).


chemical processors!
advanced engineering goes into every over-the-fence plant built with
LINDE
CERTAINTY
CERTAINTY that LINDE technology and experience is based on 50 years in the business of low-temperature separation. CERTAINTY that your oxygen plant built by LINDE will deliver a consistently pure product at the guaranteed low price. CERTAINTY that completely automated processes will maintain on-stream time at a maximum.
LINDE COMPANY
DIVISION OF UNION CARBIDE CORPORATION
UNION CARBIDE

MILESTONES IN CHEMISTRY

published by Miles Chemical Company, Elkhart, Ind.

What's eating cellulose?

Cellulose is not only nature's most abundant nonprotein fiber; it is also one of the most resistant to attack. But there are certain microorganisms that relish cellulose and eat it with abandon, knowing they will be able to digest it with the aid of an enzyme named cellulase. Easy to remember.

Until recently, the discussion of cellulase has been mostly academic. Two reasons for this: the inherent stability of the cellulose substrate and industry's inability to produce a commercially feasible cellulase enzyme system.

Not so at Miles. Through proper selection of strain and fermentation medium, Miles has produced a highly potent cellulase at a price that is attractive to most industries. The name: Takamine Cellulase 4000.

Takamine Cellulase 4000 depolymerizes native and synthetic cellulose products. Paper, cotton, wood, soybean hulls, substituted carboxymethyl cellulose and other beta glucosides are all digested in stride.

Takamine Cellulase 4000 is safe for use in food and is exempt from the Food Additive Amendment to the FDC Act. In brewing, it increases the body of finished beers. In citrus juices, it clarifies and increases juice yields. It aids in the extraction of essential oils and other natural flavors by breaking down plant cell walls. Pharmaceutically, it aids in the human digestion of bulky matter which causes discomfort in old and young alike.

Suburbanites with septic tank troubles please note: Takamine Cellulase 4000 effectively destroys paper and other wastes when used as a component of septic and drain cleaners.

And there's more. Takamine Cellulase 4000 may have application in the textile and paper industries because of its ability to modify the surface of industrial cellulose products without materially altering strength.

Matter of life and death

Scientists have more than a sneaking suspicion about the importance of nucleic acids in the function of all living cells. Many believe that definitive knowledge of the structure and functions of these huge molecules will shed light on such basic biochemical processes as protein synthesis, genetics, viruses and cancer. The foremost problem is structure. Ribonucleic acid (RNA) and deoxyribonucleic acid (DNA) are among the most complex materials known. Miles serves investigators in this important field of nucleic acid research two ways.

First, Miles produces one of the homopolymers, poly A, as the polyadenylic acid potassium salt. It is available to researchers for structural study or for further polymerization. Second, Miles produces enzymically active dried cells of the organism *Micrococcus lysodeikticus* which is the best source of the enzyme polynucleotide phosphorylase. This enzyme, available to research workers, in turn, is used to polymerize single nucleotides into RNA strands.

Getting the most out of protein

Lactic acid, as it occurs naturally in man and animals, consists predominantly of dextrorotatory (L+) isomers. Now Miles makes a mixture of isomers in which the dextrorotatory form (L+) accounts for 82% and the levorotatory form (D−) accounts for 18% of the acid. This preponderance of the dextrorotatory isomer is expected to give special value in food and feed products, minimizing undesirable flavors and improving the efficiency of protein utilization.

It is expected to open new doors in the form of medical ointments and creams where a racemic mixture of isomers is ineffective. The L+ isomer also may find use in the synthesis of polyester resins having special chemical and mechanical properties.

Background and breeding

The process of fermentation is no accidental skill at Miles. For years the techniques have been carefully nurtured and developed. Best example of this is the process by which we make citric acid. It's a unique deep-fermentation process which employs the talents of a specially bred species of microbes — mutants created by deliberately and carefully exposing the strain to intense ultra-violet light.

You might say it's a case of good background and good breeding. The background is ours and the breeding is theirs (the microbes'). Result? Citric acid of remarkable purity.

Build you a molecule?

Like they used to say down at the old general store, "If you don't see what you want, ask for it."

We have the facilities and people to carry through some 18 unit processes in addition to what we've talked about here. Plus a burning desire to study your custom requirements. Who knows? We may be able to tailor an existing product to fit your special needs. And sometimes small-batch custom work turns out to be a good investment. Let's get together and talk about it.

Miles Chemical Company

Division of Miles Laboratories, Inc.

Elkhart, Indiana

Phone COngress 4-3111

Digging Two Miles Down For Better Waste Disposal

This month the Omaha District of Army Engineers is seeking bids for the drilling of a deep well for disposal of chemical wastes from the Rocky Mountain Arsenal near Denver. And industry men are closely watching every phase of the project. For the Army's waste disposal problem parallels that of many chemical companies—a problem made more acute by the public's awareness of pollution perils.

The Arsenal's well will be a trailblazer in many ways. Besides being a wildcat (uncharted hydrologically), it will be drilled to a depth of 11,400 ft.—by far the deepest yet sunk. It can extend greatly the knowledge of how to pump liquid wastes deep into porous, underground rock layers. Shallower wells have proved to be the only effective method of disposal of some chemical materials. Dow Chemical, Upjohn, Hooker Chemical and Ford Motor Co. (for ammonia still liquor) are among the companies that have disposal wells in Michigan. Shell in Louisiana and Texas, and Du Pont in Texas, are among the others that have wells.

Advantages for a Price: Still, the companies that have had experience with deep-well disposal to date are relatively few. While the use of deep wells seems to be a simple, clean way to get rid of large quantities of waste, costs are a weighty factor. In fact the Arsenal well has already been caught in a cost snarl. It was designed to receive wastes at a rate of 400 gpm. under 2,000-psi. pressure, and was figured to cost about $234,000, according to Army Engineers. Initial bids, opened Dec. 15, were more than 20% higher than this estimate, and bidding has been reopened.

But costs don't end with the deep-well placement. Because most solids plug a well, wastes must first be settled, filtered and sometimes treated. The Arsenal's treatment plant to remove colloidal solids (designed by A. J. Ryan and Associates, Inc., and covered by a separate bid) will push the total project cost up to about $900,000.

The Arsenal deep well, like those in other locations, will be more expensive on a per-gallon-disposed-material basis than ordinary biological treatment plants, according to Tom Powers of Dow Industrial Service, consultant for the job.* But if extraction and burning steps must be used for complex organic wastes, deep-well disposal isn't more costly, Powers adds.

Deep wells may also have economic advantages for disposal of some radioactive wastes. The method is not being used now because the geologic formations needed are not found—or at best are only poorly developed—at the present major waste-producing sites.

Biggest Potential: Disposal of inorganic salts will probably be the chemical companies' most important use of deep wells. Now their only alternatives are massive dilution or evaporation in storage ponds.

The Rocky Mountain Arsenal has tried the latter—with headaches. The Arsenal produced "nerve gas" during World War II, is now on stand-by except for a section of the plant that is leased to Shell Chemical for making insecticides. Both processes turn out wastes high in inorganic salts (mainly sodium chloride). Initially the wastes were dumped into a pond for evaporation. But when nearby farmers, tapping an aquifer 60-90 ft. below ground for irrigation water, complained that crops were damaged by the water, the U.S. Public Health Service ruled that the Arsenal's waste was responsible.

In '56 a sealed-bottom pond using an asphaltic membrane was built. The pond has a capacity of 250-million gal., covers a 93-acre area, cost about $500,000, and is now nearly filled to capacity.

Drill for Disposal: The Omaha Dis-

* Powers, consulting director of Dow Industrial Service, was in charge of Dow Chemical's industrial waste facilities at Midland, Mich., for 23 years. Part of his responsibility: supervising operation of about 30 deep wells—probably the largest concentration in the country (*CW, March 19, '60, p. 47*).

CHLOR-ALKALI MANAGER

We have an opening for a man experienced in chlorine production, to take charge of a new chlor-alkali plant in Canada.

Technical training is desirable but not essential, alternatively a man with good experience in similar unit processes including compression of gases will be considered.

Excellent salary. Please give details of experience and training in first letter. All applications treated in confidence. Address replies to:

CHLOR-ALKALI,
Box 362, Station H,
Bishop and St. Catherine Sts.
Montreal 2, Que.

SENIOR CHEMIST
MAKE YOUR MOVE NOW
Join a New Electro-Photography Group

Excellent challenge in Research & Development for senior chemist or chemical engineer with growth company in upper New York State, now advancing a concept from the product research to the product development stage.

We offer the right man having a background in electro-photography the chance to establish his own facilities and laboratory and to staff his own department.

An advanced degree in physical chemistry or in chemical engineering would be helpful, but specific experience in the field of electrophotographic process is a prime requisite.

For confidential interview appointment, send your complete resume including salary requirements.

P. 5841 Chemical Week
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

Chemical Week

ADVERTISERS' INDEX

ALLIED CHEMICAL CORP., NITROGEN DIV. Agency—G. M. Basford Co. 19

AMERICAN AGRICULTURAL CHEMICAL CO., THE Agency—Marsteller, Rickard, Gebhardt & Reed, Inc. 2

ANSUL CHEMICAL CO. Agency—Brad Sebstad, Inc. 38

ARMOUR PHARMACEUTICAL CO. Agency—Jordan-Sieber & Corbett, Inc. 45

BLOCKSON CHEMICAL CO. Agency—Wm. Balsam Adv. 7

BZURA CHEMICAL CO., INC. Agency—Ray Ellis Advertising, Inc. 39

CABOT CORP. Agency—Larcom Randall Adv., Inc. 3rd cover

CHEMICAL MFG. CO. Agency—Geyer, Morey, Madden & Ballard, Inc. 38

CHEMICAL SOLVENTS, INC. Agency—Asher, Godfrey & Franklin, Inc. 45

COMMERCIAL SOLVENTS CORP. Agency—Fuller & Smith & Ross, Inc. 40

EASTMAN CHEMICAL PRODUCTS INC. Agency—Fred Wittner Co. 53

EMERY INDUSTRIES, INC. Agency—Farson, Huff & Northlich, Inc. 14-15

FMC CHLOR-ALKALI DIV. OF FOOD MACHINERY & CHEMICAL CORP. Agency—James J. McMahon Adv. 2nd cover

GOODYEAR TIRE & RUBBER CO. Agency—Kudner Adv. Agency 1

GULF OIL CORP. Agency—Ketchum MacLeod & Grove, Inc. 30

HALL CO., THE C. P. Agency—Cruttenden Advertising 36

HERCULES POWDER CO. Agency—Fuller & Smith & Ross, Inc. 8-9

HOOKER CHEMICAL CORP. Agency—The Rumrill Co., Inc. 49

JEFFERSON CHEMICAL CO. Agency—Robinson-Gerard-McGary, Inc. 50

KAY-FRIES CHEMICALS, INC. Agency—Leonard Stein Adv. 60

KOPPERS COMPANY, INC. Agency—Marsteller, Rickard, Gebhardt & Reed, Inc. 29

LINDE CO. DIV. OF UNION CARBIDE CORP. Agency—J. M. Mathes, Inc. 59, 61, 63

MARATHON, A DIV. OF AMERICAN CAN CO. CHEMICAL SALES DEPT. Agency—Maercklein Advertising 32

METAL & THERMIT CORP. Agency—Marsteller, Rickard, Gebhardt & Reed, Inc. 37

MID AMERICA PIPELINE CO. Agency—Ferguson, Miller Assoc. 6

MICHIGAN CHEMICAL CORP. Agency—Aves, Shaw & Ring, Inc. 20

MILES CHEMICAL CO. Agency—Klau-Van Pietersom-Dunlap, Inc. 64

NOPCO CHEMICAL CO. Agency—Gray & Rogers Adv. 62

PRIOR CHEMICAL CORP. Agency—Robertson Martin Adv. 32

RESISTOFLEX CORP. Agency—Adams & Keyes, Inc., Adv. 10

SHELL CHEMICAL CO. Agency—Ogilvy, Benson & Mather Inc. 16

SIGNAL OIL & GAS CO. Agency—Erwin Wasey, Ruthrauff & Ryan, Inc. 11

STROHMEYER & ARPE CO. Agency—J. M. Kesslinger & Assoc. 32

TITANIUM PIGMENT CORP., SUB. OF NATIONAL LEAD CO. Agency—Doyle, Kitchen & McCormick, Inc. 4th cover

UNION CARBIDE CHEMICALS, CO., DIV. OF UNION CARBIDE CORP. Agency—J. M. Mathes, Inc. 26

UNION CARBIDE PLASTICS CO., DIV. OF UNION CARBIDE CORP. Agency—J. M. Mathes, Inc. 4

VANDERBILT CO., R. T. Agency—Pearsall & Schael 44

WEST END CHEMICAL CO. Agency—Norton M. Jacobs Co. 46

WEST VIRGINIA PULP & PAPER CO. Agency—Fuller & Smith & Ross, Inc. 58

WITCO CHEMICAL CO. Agency—Hazard Advertising Co. 12-13

ADVERTISING STAFF

Atlanta 9 ..... Michael Miller
1375 Peachtree St., N.E. TRinity 5-0523

Boston 16 ..... Paul F. McPherson,
Copley Square, COngress 2-1160

Chicago 11 ..... Alfred D. Becker, Jr.,
R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

Cleveland 13 ... H. J. Sweger, Duncan C. Stephens
1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000

Dallas 1 ..... Gordon Jones, John Grant
901 Vaughan Bldg., 1712 Commerce St., Riverside 7-9721

Denver 2 ..... J. Patten,
1740 Broadway, ALpine 5-2981

Detroit 26 ..... H. J. Sweger, Jr.,
856 Penobscot Bldg., WOodward 2-1793

Frankfurt/Main ..... Stanley Kimes,
85 Westendstrasse, Germany

Geneva ..... Michael R. Zeynel
2 Place du Port, Geneva, Switz.

Houston 25 ..... Gene Holland
W-724 Prudential Bldg., JAckson 6-1281

London E.C. 4 ..... E. E. Schirmer, N. Murphy,
McGraw-Hill House, 95 Farringdon St., England.

Los Angeles 17 ..... Robert Yocom,
1125 West Sixth St., HUntley 2-5450

New York 36 ..... Charles Haines, B. A. Johnson,
Paul F. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3 .... William B. Hannum, Jr., J.E.B. Ladouceur, 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens,
4 Gateway Center, EXpress 1-1314

Portland 4 ..... Scott B. Hubbard
Room 445, Pacific Bldg.

St. Louis 8 ..... R. J. Claussen
3615 Olive St., Continental Bldg., JEfferson 5-4867

San Francisco 4 ..... William C. Woolston
68 Post St., DOuglas 2-4600

trict of Army Engineers—under Col. Harry G. Woodbury, district engineer; J. O. Ackerman, chief of engineering; Gordon D. Haugse, project engineer; and Ray Mershon, resident engineer—picked the Fountain formation for a deep well to solve the Arsenal's disposal problems. Twenty miles away, at the Park of the Red Rocks, it is a gaudy red outcropping of medium-grain sandstone that should be absorptive. But at the well site it is 11,000 ft. underground—just atop the basic granite layer.

The stratum is 1,200-1,500 ft. thick, well below oil-bearing J sand and 9,000 below any formation that would have fresh water. Some areas of the country are less fortunate. For example, in New Jersey, fresh water is found all the way down to basic granite at 1,800 ft., and deep-well disposal would not be possible. However, Michigan seems to be a golden area for deep wells. Most of the underground water is salty. Contamination is not a problem, and wells have to be sunk only to 3,000-4,000 ft. in some places.

As with other deep wells, the Arsenal well (about 2 ft. in diameter at the top, narrowing as it goes down) will have a 5½-in. injection tube set inside a triple layer of casing, which will guard against leakage in upper rock layers. Water injected between the tube and casing will serve as a gauge to indicate leaks.

As the well is drilled, rock samples will be taken, tested for porosity by design contractor E. A. Polumbus, Jr., and Associates. Testing will also tell whether the rock can be acidized with hydrochloric acid to dissolve the sandstone binder, make the rock more porous. If it can't be acidized, it will have to be fractured hydraulically (with water under pressure of about 1 lb./sq. in./foot of depth of the well).

Army engineers expect that even after several years of injection an area of only one-half mile in diameter will have been penetrated by the wastes. This, of course, is always an uncertainty with deep wells—what the ultimate capacity of a well will be, or how much pressure will be needed to pump wastes out into the rock, is a gamble. But apparently it's a gamble the chemical industry will have to take more frequently as pollution laws become more stringent.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

Published: each Saturday—closes 11 days in advance.

Rate—$3.00 per line ($1.50 per line for position wanted ads), minimum 3 lines. Allow 5 average words as line; Count one half line for box number.

ADDRESS BOX NO. REPLIES TO:
BOX NO. ———
Classified Adv. Div. of this Publication
Send to office nearest you.
P.O. Box 12, New York 36, N. Y.
520 N. Michigan Ave., Chicago 11, Ill.
68 Post St., San Francisco 4, Calif.

POSITIONS VACANT

Wanted: Retiring chemist interested in part time work in Sunny Carolina. Good proposition with small progressive company. P-5820, Chemical Week.

Wanted: Graduate Chemical Engineers with a minimum of five years experience and Research and Development Chemist with B.S. or M.S. Degree and at least five years experience in research and development activities. Work will be process and product development in phosphate mining and processing operations in large plant with major expansion program now underway. Permanent location in Central Florida. Excellent opportunity for advancement. Salary commensurate with experience. Send detailed resume to Personnel Department, American Cyanamid Company, Brewster, Florida.

Editorial Position—Immediate opening on Chemical Engineering's editorial staff of 19 engineer-editors for another young engineer to solicit, evaluate, edit or write technical news stories or articles on process and engineering developments and trends in the chemical process industries. Unusual opportunity to broaden industry and professional contacts, education and experience. Requirements: Degree in chemical engineering or closely related field with 1-5 years experience in chemical process work; ability to evluate chemical process and engineering information; able to write clearly, concisely and accurately; must like and work well with people; initiative and imgagination. New York City location with opportunity for some out-of-town travel. Please send complete resume of education, experience, salary requirement and other pertinent information to: Personnel Dept., McGraw-Hill Publishing Co., 330 West 42nd Street, New York 36, New York.

Chemical Engineer: PHD. or M.S. Experienced in commercial Chemical Development for West Coast chemical company, for position as Assistant to Vice President Research and Development. Age 30 to 40. Send complete resume to: P-5828, Chemical Week.

Chemists . . . Research Chemist—Synthetic organic development work in fatty derivatives. M.S. 2-10 years exp. in organic synthesis required. Analytical Methods Development Chemist develop new methods of analysis; trouble-shooting analysis. Prefer experience in vitamin or feed formulation; instrumentation. M.S. required Salaries commensurate with experience and potential. Send resumes to: Professional Relations, Nopco Chemical Co., 60 Park Place, Newark, N. J.

SELLING OPPORTUNITY AVAILABLE

Wanted—Chemical Salesman with imagination We have excess capacity in large Pfaudler and similar reactors located in Georgia. What can we make that you can sell at a profit? SW-5589, Chemical Week.

POSITIONS WANTED

Sales Planning, promotion, performance plastics and chemicals. Integrate advertising, publicity, technical service. Will relocate. PW-5794, Chemical Week.

Purchasing chemicals; excellent experience; age 30; administrative aptitude; college graduate; seeks growth. PW-5881, Chemical Week.

PROFESSIONAL SERVICES

Literature search, Chemical research, Development, synthesis, applications: organic and industrial chemicals, surfactants. Formulation: chemical specialties, detergent compositions. Chemical Information and Research Bureau, 59 Van Duyne Ave., Wayne, N. J.

CONTRACT WORK WANTED

Spray Drying: Foods, Pharmaceuticals, Chemicals, etc. Complete stainless equipment, including sanitary piping, pumps, mixing tanks and packers. Located New York area on railroad siding. Available on contract or unit volume. When inquiring give full particulars. CWW-5775, Chemical Week.

Custom Grinding-Ultra Fine or Coarse-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete CO_2 installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682, Oak Lawn, Illinois.

Custom Grinding . . . Pelletizing: Polyethylene, Polyprooylene, Polystyrene, other thermoplastic materials. Film and sheeting scrap, lumps, filament waste, etc. Also air separation of sweepings & other contaminated molding powders. Equipment includes Sprout-Walron Pelletizer, Cumverland Grinders, Air Table. Private RR siding. Plastics Reclaiming Corp., Tomkins Tidewater Terminal, South Kearny, N.J. MItchell 3-4145.

SPECIAL SERVICES

International Consultant, Expert on European chemicals, specialties, process equipment markets, specialist Common Market, Free Trade Assocn. developments, leaving for Europe late Jan. Will undertake market surveys, exnort contacts, investigate joint venture, acquisition possibilities, plant location studies for branch manufacturng projects. Reasonable fees. SS-5868, Chemical Week.

Do you every buy Chemicals quietly? We do, confidentially, for undisclosed customers, one pound or a carload, domestic and foreign. Contact Chemicals International, Inc., Suite 1102 Prudential Bldg., Houston 25, Texas, JAckson 4-4141.

BUSINESS OPPORTUNITIES

AAA-1 Corp. Seeks Acquisition. We will consider firms in the chemical process industry, regardless of end product. Desired sales of $1-million or over and definite growth potential. Initial reply should reveal information which would lead to personal contact. Principles Only—write in confidence to BO-5781, Chemical Week.

We have a large plant containing buildings, equipment for chemical & asphalt production, tanks and boilers. Have you a product to fit this equipment? Call Lowell 6-2400, Matawan, N.J.

EQUIPMENT FOR SALE

60" dia. x 35 plate T316 stainless bubble cap column, 42' high, dished heads. Perry, 1415 N. Sixth St., Phila. 22, Pa.

Bird 24" x 38" continuous centrifugal, T304 stainless, conical bowl, w/spare new bowl, complete. Perry, 1415 N. 6th St., Phila. 22, Pa.

1350 gal. T347 stainless jacketed kettle, anchor agit. Perry, 1415 N. Sixth St., Phila. 22, Pa.

600 gal. T304 stainless reactor, 4'-6" x 5', dished heads, coils, jacketed, agit. Perry, 1415 N. 6th St., Phila. 22, Pa.

CHEMICALS WANTED

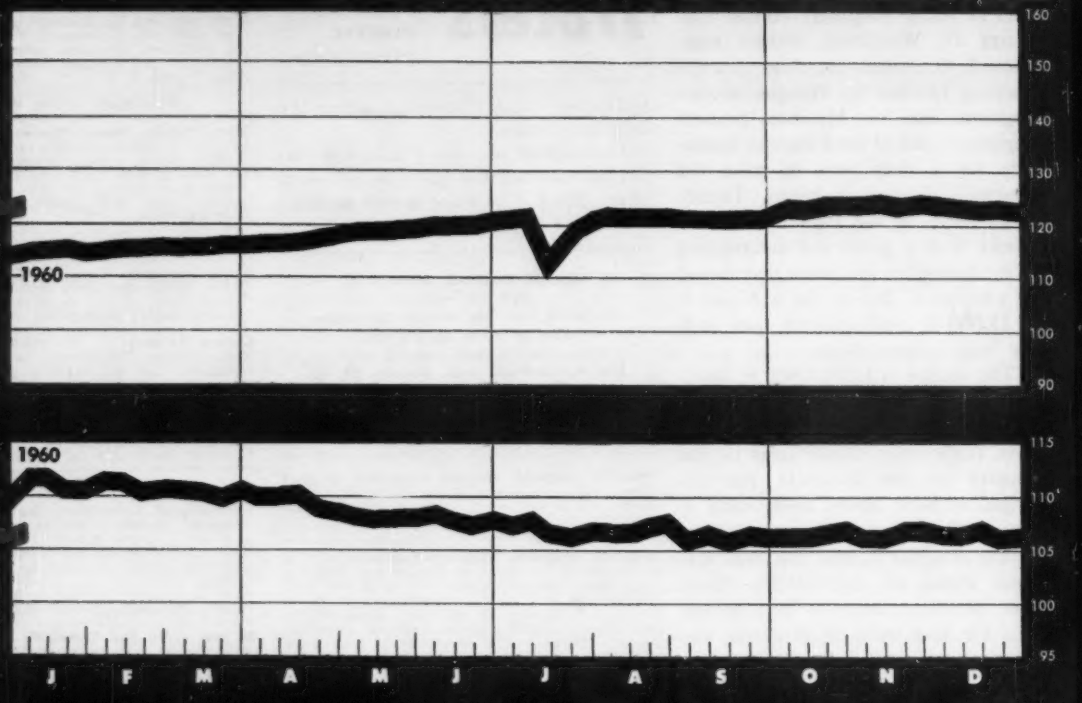
Wanted: Surplus C-4-C7 Alcohols, Prefer primary, normal or iso, or mixture. Purity no problem. W-5862, Chemical Week.

WANTED

Wanted: A synthetic resin producer with excess capacity. Must have two 300 gal. SS reactors capable of operation at 500° F and ½ mm vacuum. We have an assured market of 15,000 lb. per mo. with a potential of 40,000 lb. per mo., and can supply pilot plant data. W-5884, Chemical Week.

If you are a manufacturer seeking new or added sales outlets—or if you are a manufacturer's agent or chemicals distributor with the capacity, time and energy to take on additional lines—make your interests known in this column of Chemical Week. The right agent or jobber teamed up with the saleswise manufacturer makes the right combination for the hard selling days ahead. There's profit for both, which can be initiated through low-cost classified advertising. Write Employment Opportunities, Chemical Week. P.O. Box 12, New York 36, N.Y.

BUSINESS BENCHMARKS



JANUARY 7, 1961

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	124.2	124.5	115.9
Chemical Week wholesale price index (1947=100)	107.0	106.8	110.9
Steel ingot output (thousand tons)	1,335	1,387	2,641
Electric power (million kilowatt-hours)	15,021	14,604	14,115
Crude oil and condensate (daily av., thousand bbls.)	7,132	7,152	7,138

WHOLESALE PRICE INDICATORS (47-49=100)	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods)	127.8	128.0	128.5
Chemicals and allied products	110.3	110.3	110.0
Industrial chemicals	123.5	123.6	123.9
Paint and paint materials	119.6	119.7	118.7
Drugs, pharmaceuticals and cosmetics	94.3	94.4	93.8
Fats and oils (inedible)	48.9	47.8	52.2
Fertilizer and materials	111.8	111.1	106.6

CHEMICAL CUSTOMERS CLOSE-UP

FACTORY SALES OF PASSENGER CARS

MANUFACTURERS' SALES OF TEXTILES

Wet or Dry...

AS ANTICAKING AGENT: add just 0.4% Cab-o-sil, shake — and caky sulfur (left) is transformed into a free-flow powder.

AS WETTING AGENT: ordinary sulfur, with no Cab-o-sil added, remains caky in water solution (left). With Cab-o-sil added (right) free-flowing sulfur is dispersed instantly and thoroughly.

CAB-O-SIL® *works magic with caky materials*

A mere pinch of Cab-o-sil, the superfine "airborne" silica, transforms "problem" powders which tend to cake, into smooth-flowing powders. And, as the pictures show, this highly versatile material also doubles in brass as a magically efficient wetting agent. You just combine 0.4% Cab-o-sil by weight with the caky material; add the mixture to an aqueous solution, and presto! . . . all of the particles wet down uniformly and evenly throughout the solution. In some cases, grinding of the Cab-o-sil and caky material will provide more effective wetting action.

These are just two of many useful characteristics of this unique superfine silica . . . characteristics which spring from its absolutely unique combination of properties, including exceptional purity (99.7%); excellent hydrophilic properties; superfineness (11.1 million billion particles per gram); and enormous external surface area (200 m^2/gm).

Add to these features Cab-o-sil's capacity for doing the job in remarkably low concentrations, and you have the reason why Cab-o-sil is being used in so many different ways, in countless numbers of industries today.

USES:

- **Thixotropic, thickening, gelling agent** — lubricating oils, greases, polyester resins, epoxy resins, plastisols, plastigels, organosols
- **Suspending agent** — paints
- **Flatting agent** — varnishes, lacquers, organosols, plastisols
- **Reinforcing agent** — rubber, silicone, latex film
- **Anticaking agent** — sulfur, insecticides
- **Antislip agent** — solvent-base floor waxes
- **Precoating material** — reproduction paper
- **Low temperature thermal insulation**
- **Pharmaceuticals and Cosmetics — (See bulletin #cpha-1)**

Minerals & Chemicals Div., CW

CABOT CORPORATION

125 High Street, Boston 10, Mass.

Please send ☐ free Cab-o-sil sample and other technical data checked

NAME .....

TITLE .....

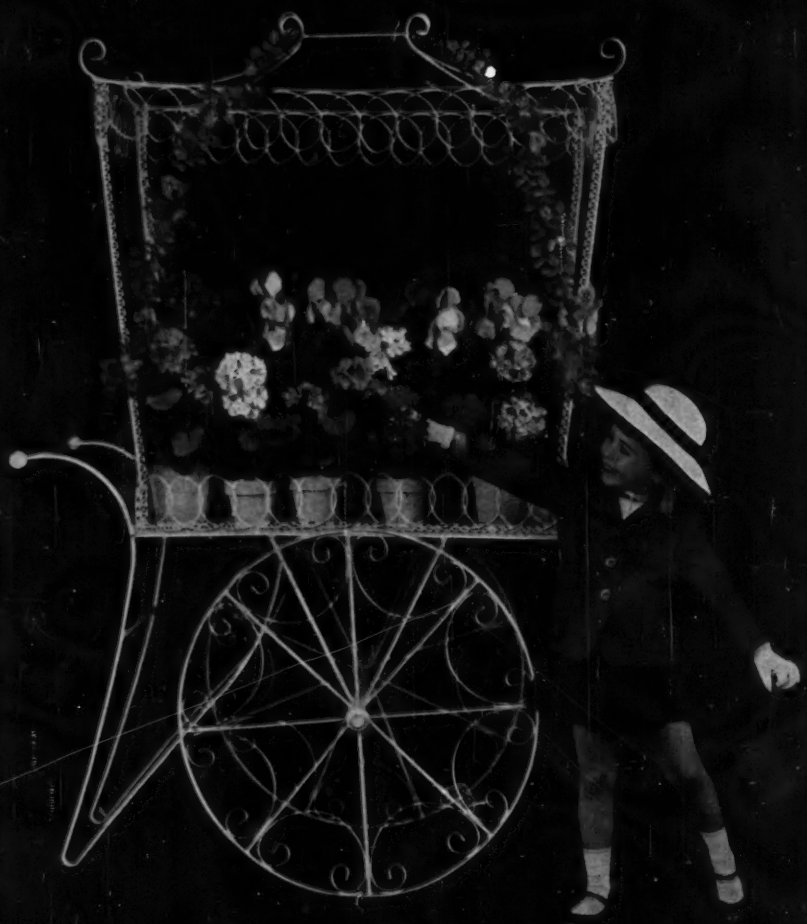
COMPANY .....

ADDRESS .....

.....

Technical data available:

( ) General Properties, Functions and Uses (#cgen-1)
( ) Cab-o-sil in Butyl Rubber (#crub-2)
( ) Cab-o-sil in Dipped Latex Films (#crub-3)
( ) Cab-o-sil in the Lubricating Grease Industry (#cgre-2)
( ) Aqueous Dispersions of Cab-o-sil (#cmis-2)
( ) A Flatting Agent for Varnishes (#cpai-3)
( ) Cab-o-sil in the Reproduction Paper Industry (#cpap-1)
( ) Cab-o-sil in the Plastics Industry (#cpla-2)
( ) Cab-o-sil in Automobile Polishes (#cpol-1)
( ) Cab-o-sil in Pharmaceuticals and Cosmetics (#cpha-1)



Her artificial flowers are alive ...with TITANOX®

The colors of nature's palette strong reds, gentle pastels, glistening whites and delicate greens are reproduced in plastic flowers with the aid of TITANOX white pigments.

In plastic compositions of all types, these white titanium dioxide pigments yield the vital qualities that help colors and textures come alive and stay alive. And for white paint coatings such as those used on the cart and the flower pots, TITANOX is the first choice in white pigmentation.

And because of their uniform brightness, whiteness and opacity and their ease of fine dispersion, TITANOX pigments help simplify production problems. That's why they're so widely used not only for plastics and paints, but also for paper, ceramics, leather, rubber and virtually anything else that requires white pigmentation. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y., offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

TITANIUM PIGMENT CORPORATION

SUBSIDIARY OF NATIONAL LEAD COMPANY

TITANOX